	AGENDA - UPPER SELWYN HUTS COMMITTEE			
Date	28 August 2019	**Time**	4.30 – 6.00 pm	**Location:** Springston South Soldiers Memorial Hall, Days Road
Council Committee	Mayor (Sam Broughton), Councillors (Grant Miller, Malcolm Lyall, Debra Hasson), Chief Executive (David Ward)			
Community Reps	Upper Selwyn Huts Representatives – Graeme Young, Graham Evans, Robin Hyde			
Staff	Douglas Marshall (Property & Commercial Manager), Murray Washington (Asset Manager), Murray England (Water Services Manager), Greg Bell (Corporate Services Manager), Tanya Maylam (PA Group Manager Property)			
Apologies				

1.	**Welcome and Apologies**
2.	**Notes from Previous Meeting** • Attached are the notes from the meeting held on 26 June 2019 for information (Appendix 1)
3.	**Matters Arising from Last Meeting** • Financial figures outlining costings for the preferred system to be reported back so final report could go back to 11 September Council meeting.
4.	**Update from Meeting with Environment Canterbury** On Wednesday 17 July 2019 Murray Washington and Murray England from Selwyn District Council met with Environment Canterbury staff Nadeine Dommisse (Chief Operating Officer), Catherine deGraaff and Virginia Loughnan (Consenting Leads) to discuss the consenting of the Upper Selwyn Huts wastewater system. Environment Canterbury were aware of the challenges with wastewater at the Huts. There was general acceptance that a short term consent using the existing system, with potential limitations, was a supported way forward in principle. The key to any short term consent would be clear deliverables interns of how Council would move from the short term to medium - long term solution. The application would need to show in a clear structured approach the process of determining the ultimate solution would be achieved including consultation, design, consenting and construction. Consultation with Taumutu will be key before lodging any application. Following the meeting, the attached image (Appendix 2) was developed to illustrate how the consenting process may proceed.
5.	**Pond Level Graph – Updated** Please see graph attached (Appendix 3)

6.	**Update on Hut owners Response to the 'Issued Notice to Rectify'** • Murray England will report at the meeting.
7.	**Suitability of Existing Border Dyke Disposal System Going Forward** • The table attached (Appendix 4) shows the nitrogen and phosphorus loading rates on the Selwyn Huts discharge area based on the sampling results and assumes maximum consented volume is discharged. This is an initial assessment. The analysis shows an annual nitrogen loading rate of approximately **300 kg N/ha/yr**. This rate is likely to be assessed as having a significant environmental effect given the depth to groundwater, and the sensitivity of the surrounding environment. Options to reduce the loading rate include, in order of preference for the short term response: • Reduce volume discharged • Cut and carrying the grass from the discharge area (i.e harvesting nutrients); • Increasing the size of the discharge area; • Reducing the nitrogen concentration in the discharge by improvement the level of treatment.
8.	**Survey of Pond and Monitoring Bores** • This item will be discussed at the meeting.
9.	**Water Quality Sampling** • See reports attached (Appendix 5)
10.	**Proposed Way Forward** • Present update paper to Councils 10 September 2019 Council meeting - Note resolution (part) from Council – 8 May 2019 "*That Council requests the Upper Selwyn Huts community to identify 3 members by 31 May 2019 to join the Council Subcommittee to review options for wastewater collection and treatment; the cost of those options, any proposed changes to the licence agreement to have effect from 1 July 2020, and that the appointed group report back to Council with their recommended proposal to the 10 September 2019 Council meeting."* This will simply be an update report. • Consult with Taumutu • Complete AEE and consent application • Lodge Short Term Consent Dec 2019 • Revise licence agreement to have effect from 1 July 2020 as per previous Council resolution. Costs incurred to date and reasonably expected in the short term to be recovered. • Operate existing plant under short term consent. This may require optimized operation including trucking of some waste, cut and carry to reduce N loading etc • Consult and agree on medium term solution • Consent 2022 and construct medium term solution (by 2024).
11.	**Previous Option Assessments and Costing** • A report to Council as background information (Appendix 6)
12.	**Correspondence Issued to Selwyn Huts Community** • Letter dated 22 July 2019 - 'Update on consent Renewal Process' (Appendix 7) • Letter dated 2 August 2019 – Declaration of hut use/occupancy survey (Appendix 8) • General notice to community – Rugby goal posts and basketball hoop removal (Appendix 9)
13.	**General Business** • General push on outstanding debt collection • Update on application to enter Upper Selwyn Huts on NZ Heritage List (Appendix 10)

	NOTES FROM A MEETING OF THE UPPER SELWYN HUTS COMMITTEE			
Date	26 June 2019	**Time**	4.30 – 5.30 pm	**Location:** Springston South Soldiers Memorial Hall, Days Road
Council Committee Present	Mayor (Sam Broughton), Councillors Malcolm Lyall, Debra Hasson			
Community Reps Present	Upper Selwyn Huts Representatives – Riki Rolleston, Graham Evans, Robin Hyde			
Staff Present	David Ward (Chief Executive), Douglas Marshall (Group Manager Property), Murray Washington (Group Manager Infrastructure), Murray England (Water Services Manager), Tanya Maylam (PA Group Manager Property)			
Apologies	Received and accepted from Councillor Grant Miller and Graham Young			

1. Welcome and Apologies

- The Mayor welcomed those present to the meeting and outlined the matters for discussion and progress since the last meeting.

2. Notes from Previous Meeting

- Attached were the notes from the meeting held on 29 May 2019 for information. It was **agreed** that these were an accurate record of the meeting and accepted.

3. Matters Arising from Last Meeting

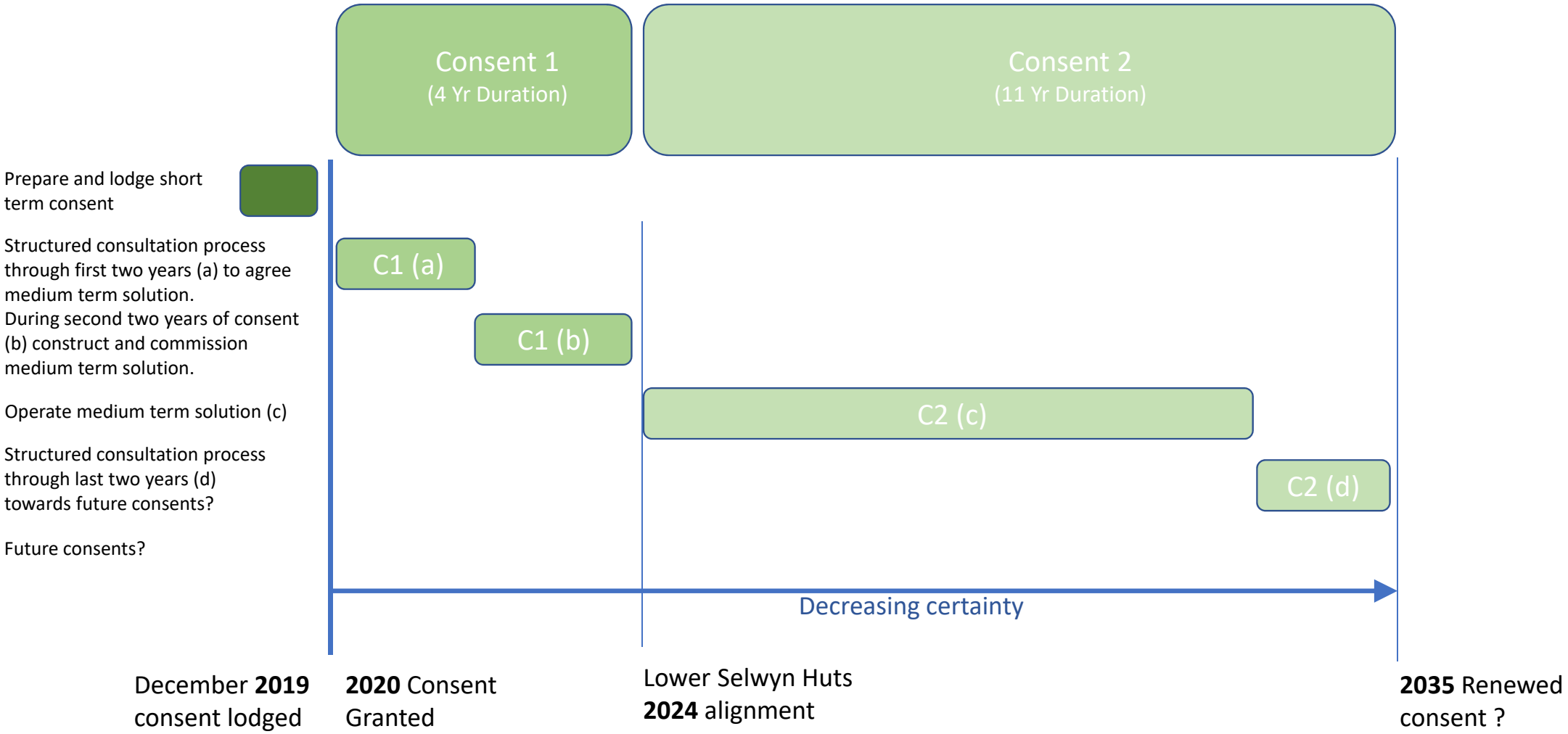
- Cost of work to date as follows:

GL	Upper Selwyn huts - Compliance Cost	Amount (NZD)
460090009	CCTV inspection with Water blasting (approx.)	13,800
460090009	Days Road drive way improvement entrance way to pond area built and fenced as per quote from GM for trucks to turn and reverse into this area for removal of liquid waste.	20,405
460090009	Carting of Extra volumes of Treated waste to Selwyn Rd PS (starting 7th June 4 trips X26 m3 -104 m3)	2,530
460090009	Weld sluice valve on disposal field gates at Selwyn huts	2,530
460090009	Manhole benching repair	4,855
460090009	Fencing Cost (approx.)	7,000
	Total	51,120

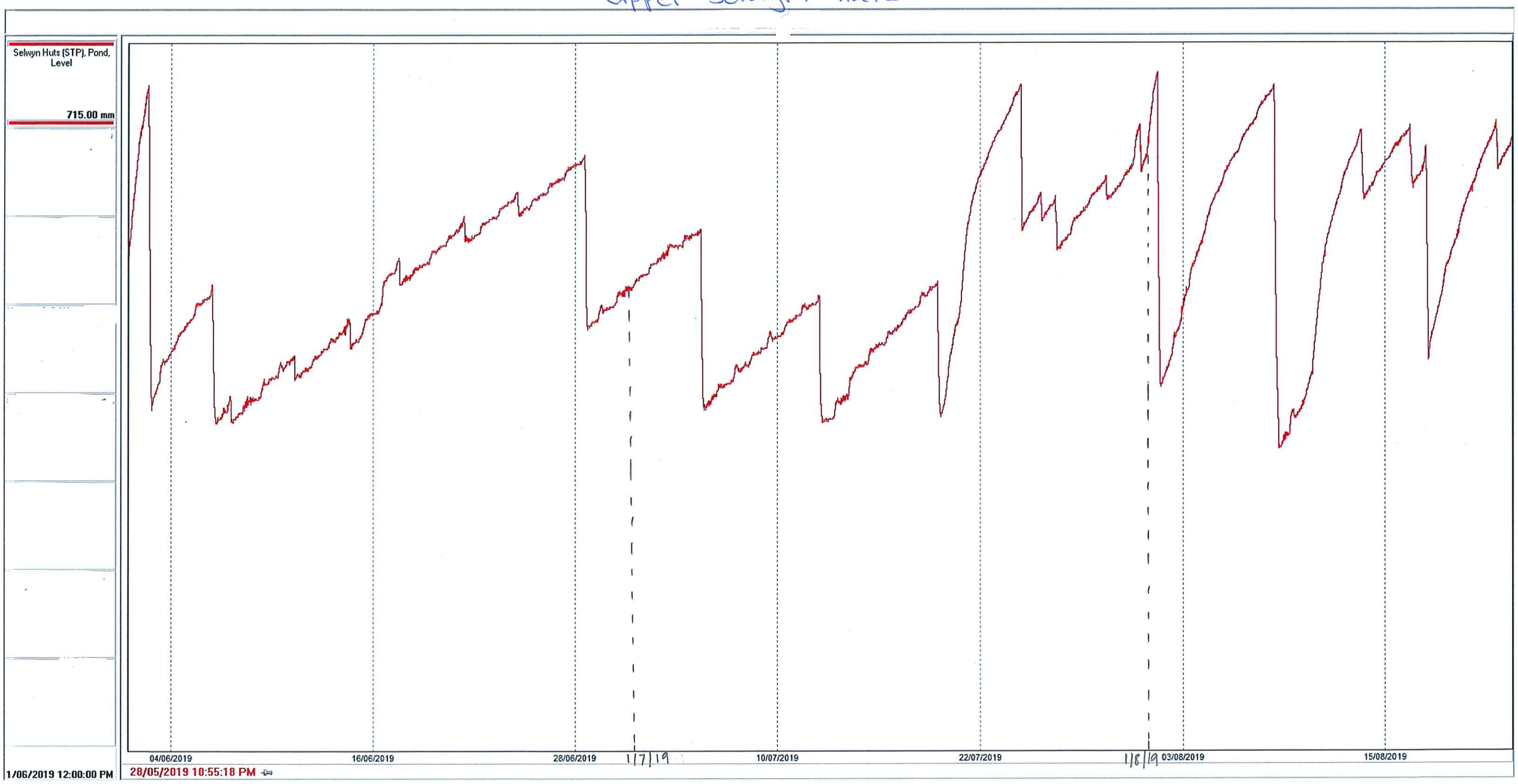
	Murray outlined the costs as outlined in the table above. • Question on Robson Environmental Discharging into the Pond - Council confirms that Robson Environmental have been engaged to pump wastewater from the Upper Selwyn Huts wastewater pond and dispose of it to the ESSS sewer scheme (Rolleston). Murray England explained a graph that had been circulated with the agenda which showed pond levels. He explained that where there are large drops in pond level, this illustrates where a discharge to the disposal field has occurred and where there are small drops in pond levels, these are where wastewater is being trucked away from the pond. • Murray England tabled another graph that was circulated in the agenda and explained the figures. The question was then asked by the community representatives that if the water table was dropping then why were Robson's emptying the pond. Murray England advised that this was dependent on the time of the month that the readings were taken and reported back to Ecan. Murray England undertook to monitor the situation and report back to the group. • The Group Manager Property advised that the issue of Robson's emptying into the ponds and the issue of Robson's being seen dumping **into** the pond was being further investigated and it was commented that it was believed to be waste from the Lower Selwyn Huts settlement. • Murray England undertook to outline what the process for the operation of the system is and advise the hut owners accordingly so they can report to Council staff any incident that is seen as possibly not being part of the process. • Comments were also made in relation to the nature of the confrontations between SICON staff and members of the public that had been on site on a number of occasions. It was noted that the Robson's driver(s) had not been involved in these confrontations. The Group Manager Property advised he would investigate this further and report back to the group. • Water Quality Sample Results – Attached were examples of water quality results for the pond and monitoring bores. Murray England lead the working group through the water sampling reports. It was noted that the monitoring reports were showing that there was no significant impact of the watering of the border dykes. It was noted that the volume of the water was probably going to be more of an issue than the water quality. It was asked how the latest sampling tested compared to the results tabled at the meeting. Murray advised that he would put together a table showing more results and report back to the group. • Land ownership around the ponds – A map showing ownership of surrounding land was circulated with the agenda. Mr Rolleston asked whether there were any documents which showed an apparent potential extension of land for disposal.
4.	**Cost Estimate and Assessment on Option – Report from Stantec** • Circulated with the agenda was the working draft of the Upper Selwyn Huts WW Assessment (version 2) as discussed with Murray England. The four agreed options for pricing included were: - existing reticulation and large package treatment at WWTP site - STEPS scheme with existing WWTP and disposal - STEPS scheme with new smaller package treatment at WWTP site - STEPS scheme with Vault and disposal to Ellesmere The LPSS and STEPs would have similar installation and maintenance costs. There would be a small OPEX saving with no de-sludging of the units. It was noted that the Stantec costs are conservative at this stage and will be further refined. • Murray England advised that the costings in this report were not finalised. • Murray England commented that letters were going to all those hut owners that had been identified as having issues with their gully traps. • It was suggested that the graph should be included with the letter and that the letter should include suggestions and how to construct/fix the gully traps and what regulations needed to be adhered to when constructing any possible solution. • An A1 graph was to be provided to Riki for presentation at a Selwyn Huts Social Event for discussion.

	• Murray England advised that the solution was to get the storm water out of the wastewater system and the rise of the ponds at time of heavy rainfall was very noticeable on the graph which indicated that the infiltration was more likely to be from storm water infiltration. • General discussion was held on the report circulated late by Graham Young and Murry England advised that this report would be looked at in further detail. • Murray Washington advised that the next stage would be to have a further meeting with Ecan who had advised that Council needed to lodge a consent by mid December 2019. He advised that a good start would be to fix the infiltration from storm water but there was still no guarantee that this would be sufficient to satisfy Ecan with all the requirements of a compliant system. • Following general discussion on this issue it was **agreed** that the storm water letter needed to have a 'to be completed by' date and a consequence if the gully trap is not fixed. • Mr Rolleston advised that in talking amongst a small number of people (approximately 15-20) that $1,200 to $1,500 per annum per hut would be acceptable to the hut owners for any upgrade. • The Mayor asked for some financial figures for the next meeting outlining costings for the preferred system, noting that there were only two meetings left before the matter had to be reported back to the Council in September. • Councillor Hasson asked if there were any obligations if the 'MBR' system was to be used that Council had to undertake future operational maintenance with their system. It was not obvious from the report.
5.	**General Business** • Next meeting dates 24 July and 28 August 2019 at 4.30 pm **The meeting concluded at 5.16 pm**

APPENDIX 2


Consent 1
(4 Yr Duration)
Consent 2
(11 Yr Duration)
Prepare and lodge short term consent
Structured consultation process through first two years (a) to agree medium term solution.
During second two years of consent (b) construct and commission medium term solution.
Operate medium term solution (c)
Structured consultation process through last two years (d) towards future consents?
Future consents?
C1 (a)
C1 (b)
C2 (c)
C2 (d)
Decreasing certainty
December **2019** consent lodged
2020 Consent Granted
Lower Selwyn Huts **2024** alignment
2035 Renewed consent ?

Upper Selwyn Huts



date	TN (g/m3)	TP (g/m3)	FC	discharge (m3)	discharge area (ha)	monthly N loading (kg N/ha)	monthly P loading (kg P/ha)
29/04/2015	28	5.5	16,000	650	0.75	24.27	4.77
6/07/2015	35	4.2	160,000	650	0.75	30.33	3.64
6/10/2015	35	5.7	16,000	650	0.75	30.33	4.94
7/01/2016	23	8.5	41,000	650	0.75	19.93	7.37
27/04/2016	42	8.1	16,000	650	0.75	36.40	7.02
20/07/2016	36	6	330,000	650	0.75	31.20	5.20
12/10/2016	52	6.5	53,000	650	0.75	45.07	5.63
5/01/2017	30	7.5	130,000	650	0.75	26.00	6.50
11/04/2017	35	6.1	61,000	650	0.75	30.33	5.29
4/07/2017	43	5.4	170,000	650	0.75	37.27	4.68
11/10/2017	21	4.4	11,800	650	0.75	18.20	3.81
19/01/2018	13	4.8	20,000	650	0.75	11.27	4.16
17/04/2018	24	3.8	40,000	650	0.75	20.80	3.29
4/07/2018	24	3.6	5,200	650	0.75	20.80	3.12
10/10/2018	31	4.6	210,000	650	0.75	26.87	3.99
Average						**27.27**	**4.89**
12-month avg						**327.25**	**58.73**

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Analytical Report

Report Number: 18/32575

Issue: 1

20 July 2018

Selwyn District Council - Groundwater
2 Norman Kirk Drive
Rolleston 7614

Attention: Fiona Rayner

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
18/32575-01	Selwyn Huts Sewage Pond	SDCHutsSP	04/07/2018 13:35	05/07/2018 08:28	0

Notes:

	Test	Result	Units	Comments	Signatory
0002	Suspended Solids - Total	50	g/m³		Marylou Cabral KTP
0083	Total Kjeldahl Nitrogen	23.3	g/m³		Marylou Cabral KTP
0515	Nitrite Nitrate Nitrogen	0.111	g/m³		Divina Lagazon KTP
1004	Temperature on arrival	6.4	Deg C	Complies	Tori Stevens
2080	Total Phosphorus	3.55	g/m³		Divina Lagazon KTP
2127	Total Nitrogen	24.7	g/m³		Divina Lagazon KTP
M0102	Faecal Coliforms	5,200	cfu/100ml		Sunita Raju KTP
R-0056F	Dissolved Oxygen - onsite reading	5.4	g O2/m³		Dan Westlake .

Comments:

Sampled by customer using ELS approved containers.

Test Methodology:

Test	Methodology	Detection Limit
Suspended Solids - Total	APHA 22nd Edition Method 2540 D	3 g/m³
Total Kjeldahl Nitrogen	APHA 22nd Edition 4500-N(org) B	0.8 g/m³
Nitrite Nitrate Nitrogen	Flow Injection Autoanalyser following APHA 22nd Edition Method 4500-NO3 I.	0.005 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA 22nd Edition Method 4500-P G. Persulphate digestion follows APHA 22nd Edition 4500-P B.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA 22nd Edition Method 4500-NO3 I. Persulphate digestion follows APHA 22nd Edition 4500-N C.	0.05 g/m³
Faecal Coliforms	APHA 22nd Edition Method 9222D:2012	1 cfu/100ml
Dissolved Oxygen - onsite reading	APHA 22nd Edition Method 4500-O G. Field measurement.	1 g O2/m³

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature on arrival	The temperature of the microbiological samples, upon arrival at the laboratory must not be below 0'C or exceed 10'C.	Deg C

"<" means that no analyte was found in the sample at the level of detection shown. "Not Recovered" indicates that the compound was not successfully extracted from the matrix when it was added, at a known concentration, during the test. Detection limits are based on a clean matrix and may vary according to individual sample.

g/m3 is the equivalent to mg/L and ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Selwyn District Council - Groundwater
2 Norman Kirk Drive
Rolleston 7614
Attention: Bridgette Johnson

Analytical Report

Report Number: 18/47477
Issue: 1
17 October 2018

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
18/47477-01	Selwyn Huts Sewage Pond	SDCHutsSP	10/10/2018 12:47	11/10/2018 08:06	0

Notes:

	Test	Result	Units	Signatory
0002	Suspended Solids - Total	82	g/m³	Gordon McArthur KTP
0083	Total Kjeldahl Nitrogen	32.6	g/m³	Gordon McArthur KTP
0515	Nitrite Nitrate Nitrogen	0.228	g/m³	Tracy Morrison KTP
2080	Total Phosphorus	4.58	g/m³	Tracy Morrison KTP
2127	Total Nitrogen	31.1	g/m³	Tracy Morrison KTP
M0102	Faecal Coliforms	210,000	cfu/100ml	Sunita Raju KTP
R-0056F	Dissolved Oxygen - onsite reading	4.9	g O2/m³	Rob Deacon .

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
18/47477-02	Selwyn Huts Bore M36/6930 Bore 1	M36/6930	10/10/2018 12:13	11/10/2018 08:06	0

Notes:

	Test	Result	Units	Signatory
0605	Nitrate - Nitrogen	0.13	g/m³	Shanel Kumar KTP
0760	Ammonia Nitrogen	0.23	g/m³	Divina Lagazon KTP
2080	Total Phosphorus	0.024	g/m³	Tracy Morrison KTP
M0102	Faecal Coliforms	< 1	cfu/100ml	Sunita Raju KTP
O1309	Conductivity at 25°C	3,120	uS/cm	Prashilla Singh (transcribed by)

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
18/47477-03	Selwyn Huts Bore M36/6931 Bore 2	M36/6931	10/10/2018 11:15	11/10/2018 08:06	0

Notes:

	Test	Result	Units	Signatory
0605	Nitrate - Nitrogen	0.28	g/m³	Shanel Kumar KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	Divina Lagazon KTP
2080	Total Phosphorus	0.126	g/m³	Tracy Morrison KTP
M0102	Faecal Coliforms	< 1	cfu/100ml	Sunita Raju KTP
O1309	Conductivity at 25°C	181	uS/cm	Prashilla Singh (transcribed by)

Comments:

Sampled by customer using ELS approved containers.

Test Methodology:

Test	Methodology	Detection Limit
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total Kjeldahl Nitrogen	APHA Online Edition 4500-N(org) B	0.8 g/m³
Nitrite Nitrate Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I.	0.005 g/m³
Nitrate - Nitrogen	Ion Chromatography following USEPA 300.0 (modified).	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion follows APHA Online Edition 4500-P B.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion follows APHA Online Edition 4500-N C.	0.05 g/m³
Faecal Coliforms	APHA 9222D:Online Edition	1 cfu/100ml
Dissolved Oxygen - onsite reading	APHA Online Edition Method 4500-O G. Field measurement.	1 g O2/m³

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Selwyn District Council - Groundwater
2 Norman Kirk Drive
Rolleston 7614
Attention: Bridgette Johnson

Analytical Report

Report Number: 19/3009
Issue: 1
25 January 2019

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
19/3009-01	Selwyn Huts Sewage Pond	SDCHutsSP	22/01/2019 13:30	23/01/2019 08:50	0

Notes:

	Test	Result	Units	Signatory
0002	Suspended Solids - Total	48	g/m³	Marylou Cabral KTP
0083	Total Kjeldahl Nitrogen	23.5	g/m³	Gordon McArthur KTP
0515	Nitrite Nitrate Nitrogen	0.233	g/m³	Divina Lagazon KTP
2080	Total Phosphorus	4.87	g/m³	Divina Lagazon KTP
2127	Total Nitrogen	19.0	g/m³	Divina Lagazon KTP
M0102	Faecal Coliforms	300	cfu/100ml	Maria Norris KTP
R-0056F	Dissolved Oxygen - onsite reading	12.4	g O2/m³	Rob Deacon .

Comments:

Sampled by customer using ELS approved containers.

Test Methodology:

Test	Methodology	Detection Limit
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total Kjeldahl Nitrogen	APHA Online Edition 4500-N(org) B	0.8 g/m³
Nitrite Nitrate Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I.	0.005 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion follows APHA Online Edition 4500-P B.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion follows APHA Online Edition 4500-N C.	0.05 g/m³
Faecal Coliforms	APHA 9222D:Online Edition	1 cfu/100ml
Dissolved Oxygen - onsite reading	APHA Online Edition Method 4500-O G. Field measurement.	1 g O2/m³

Unless otherwise stated, all tests are performed in Wellington.

"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

g/m3 is the equivalent to mg/L and ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not IANZ", which are outside the scope of this laboratory's accreditation.

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Selwyn District Council - Groundwater
2 Norman Kirk Drive
Rolleston 7614
Attention: Bridgette Johnson

Analytical Report

Report Number: 19/16504
Issue: 1
09 April 2019

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
19/16504-01	Selwyn Huts Sewage Pond	SDCHutsSP	02/04/2019 13:23	03/04/2019 08:12	0

Notes:

	Test	Result	Units	Signatory
0002	Suspended Solids - Total	93	g/m³	Marylou Cabral KTP
0083	Total Kjeldahl Nitrogen	34.6	g/m³	Marylou Cabral KTP
0515	Nitrite Nitrate Nitrogen	0.333	g/m³	Divina Lagazon KTP
2080	Total Phosphorus	6.29	g/m³	Divina Lagazon KTP
2127	Total Nitrogen	33.2	g/m³	Divina Lagazon KTP
M0102	Faecal Coliforms	71,800	cfu/100ml	Maria Norris KTP
R-0056F	Dissolved Oxygen - onsite reading	4.6	g O2/m³	Rob Deacon .

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
19/16504-02	Selwyn Huts Bore M36/6930 Bore 1	M36/6930	02/04/2019 12:52	03/04/2019 08:12	0

Notes:

	Test	Result	Units	Signatory
0605	Nitrate - Nitrogen	0.34	g/m³	Shanel Kumar KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	Divina Lagazon KTP
2080	Total Phosphorus	0.032	g/m³	Divina Lagazon KTP
M0102	Faecal Coliforms	< 1	cfu/100ml	Maria Norris KTP
O1309	Conductivity at 25°C	179	uS/cm	Sharon van Soest (transcribed by)

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
19/16504-03	Selwyn Huts Bore M36/6931 Bore 2	M36/6931	02/04/2019 12:15	03/04/2019 08:12	0

Notes:

	Test	Result	Units	Signatory
0605	Nitrate - Nitrogen	0.31	g/m³	Shanel Kumar KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	Divina Lagazon KTP
2080	Total Phosphorus	0.046	g/m³	Divina Lagazon KTP
M0102	Faecal Coliforms	< 1	cfu/100ml	Maria Norris KTP
O1309	Conductivity at 25°C	175	uS/cm	Sharon van Soest (transcribed by)

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total Kjeldahl Nitrogen	APHA Online Edition 4500-N(org) B	0.8 g/m³
Nitrite Nitrate Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I.	0.005 g/m³
Nitrate - Nitrogen	Ion Chromatography following USEPA 300.0 (modified).	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion follows APHA Online Edition 4500-P B.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion follows APHA Online Edition 4500-N C.	0.05 g/m³

Hill Laboratories
TRIED, TESTED AND TRUSTED

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Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2191045 SPv1
Contact:	Lisa Shaw	**Date Received:**	11-Jun-2019
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	17-Jun-2019
	PO Box 7469	**Quote No:**	96306
	Christchurch 8240	**Order No:**	
		Client Reference:	Selwyn Huts
		Submitted By:	Catherine McGoldrick

Sample Type: Aqueous

Sample Name:		Oxidation Pond 11-Jun-2019 9:15 am	Upstream Bore 11-Jun-2019 9:00 am	Downstream Bore 11-Jun-2019 9:30 am		
Lab Number:		2191045.1	2191045.2	2191045.3		
Individual Tests						
Electrical Conductivity (EC)	mS/m	-	17.1	16.8	-	-
Total Ammoniacal-N	g/m³	-	0.042	< 0.010	-	-
Nitrite-N	g/m³	< 0.10	< 0.002	< 0.002	-	-
Nitrate-N	g/m³	0.33	0.35	0.30	-	-
Nitrate-N + Nitrite-N	g/m³	0.35	0.35	0.30	-	-
Total Phosphorus	g/m³	-	0.043	0.013	-	-
Faecal Coliforms	cfu / 100mL	-	180 #1	< 1 #1	-	-
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	89,000 #1	-	-	-	-
Escherichia coli	cfu / 100mL	86,000 #1	-	-	-	-

Analyst's Comments

#1 Statistically estimated count based on the theoretical countable range for the stated method.

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.
Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Aqueous

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter. Performed at Hill Laboratories - Chemistry; 101c Waterloo Road, Christchurch.	-	1-3
Electrical Conductivity (EC)	Conductivity meter, 25°C. Analysed at Hill Laboratories - Chemistry; 101c Waterloo Road, Christchurch. APHA 2510 B 23rd ed. 2017.	0.1 mS/m	2-3
Total Ammoniacal-N	Filtered Sample from Christchurch. Phenol/hypochlorite colourimetry. Flow injection analyser. (NH_4-N = NH_4^+-N + NH_3-N). APHA 4500-NH_3 H (modified) 23rd ed. 2017.	0.010 g/m³	2-3
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.002 g/m³	2-3
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser, screen level. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.10 g/m³	1
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1-3
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.002 g/m³	2-3

Hill Laboratories
TRIED, TESTED AND TRUSTED

R J Hill Laboratories Limited
28 Duke Street Frankton 3204
Private Bag 3205
Hamilton 3240 New Zealand

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T +64 7 858 2000
E mail@hill-labs.co.nz
W www.hill-laboratories.com

Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2197639 SPv1
Contact:	Lisa Shaw C/- Food and Health Standards (2006) Limited PO Box 7469 Christchurch 8240	**Date Received:**	24-Jun-2019
		Date Reported:	28-Jun-2019
		Quote No:	96306
		Order No:	
		Client Reference:	Selwyn Huts
		Submitted By:	Catherine McGoldrick

Sample Type: Aqueous

Sample Name:		Oxidation Pond 24-Jun-2019 1:58 pm	Upstream Bore 24-Jun-2019 1:35 pm	Downstream Bore 24-Jun-2019 1:45 pm		
Lab Number:		2197639.1	2197639.2	2197639.3		
Electrical Conductivity (EC)	mS/m	-	17.0	16.6	-	-
Total Suspended Solids	g/m³	119	-	-	-	-
Total Nitrogen	g/m³	30	-	-	-	-
Total Ammoniacal-N	g/m³	-	< 0.10 #2	< 0.010	-	-
Nitrite-N	g/m³	-	< 0.002	< 0.002	-	-
Nitrate-N	g/m³	-	0.37	0.32	-	-
Nitrate-N + Nitrite-N	g/m³	0.12	0.37	0.32	-	-
Total Kjeldahl Nitrogen (TKN)	g/m³	30	-	-	-	-
Total Phosphorus	g/m³	5.0	0.016	0.021	-	-
Faecal Coliforms	cfu / 100mL	125,000 #1	< 1 #1	< 1 #1	-	-

Analyst's Comments

#1 Statistically estimated count based on the theoretical countable range for the stated method.

#2 Severe matrix interferences required that a dilution be performed prior to analysis, resulting in a detection limit higher than that normally achieved for the NH4N analysis.

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.
Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Aqueous

Test	Method Description	Default Detection Limit	Sample No
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter. Performed at Hill Laboratories - Chemistry; 101c Waterloo Road, Christchurch.	-	1-3
Electrical Conductivity (EC)	Conductivity meter, 25°C. Analysed at Hill Laboratories - Chemistry; 101c Waterloo Road, Christchurch. APHA 2510 B 23rd ed. 2017.	0.1 mS/m	2-3
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. Analysed at Hill Laboratories - Chemistry; 101c Waterloo Road, Christchurch. APHA 2540 D (modified) 23rd ed. 2017.	3 g/m³	1
Total Nitrogen	Calculation: TKN + Nitrate-N + Nitrite-N. Please note: The Default Detection Limit of 0.05 g/m³ is only attainable when the TKN has been determined using a trace method utilising duplicate analyses. In cases where the Detection Limit for TKN is 0.10 g/m³, the Default Detection Limit for Total Nitrogen will be 0.11 g/m³.	0.05 g/m³	1
Total Ammoniacal-N	Filtered Sample from Christchurch. Phenol/hypochlorite colourimetry. Flow injection analyser. (NH_4-N = NH_4^+-N + NH_3-N). APHA 4500-NH_3 H (modified) 23rd ed. 2017.	0.010 g/m³	2-3

Eurofins ELS Limited

Analytical Report

Report Number: 19/36708

Issue: 1

17 July 2019

Selwyn District Council - Groundwater
2 Norman Kirk Drive
Rolleston 7614
Attention: Bridgette Johnson

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
19/36708-01	Selwyn Huts Sewage Pond	SDCHutsSP	12/07/2019 15:30	13/07/2019 08:58	0

Notes:

	Test	Result	Units	Signatory
0002	Suspended Solids - Total	98	g/m³	Gordon McArthur KTP
0083	Total Kjeldahl Nitrogen	43.3	g/m³	Gordon McArthur KTP
0515	Nitrite Nitrate Nitrogen	0.226	g/m³	Divina Lagazon KTP
2080	Total Phosphorus	5.90	g/m³	Divina Lagazon KTP
2127	Total Nitrogen	42.5	g/m³	Divina Lagazon KTP
M0102	Faecal Coliforms	20,200	cfu/100ml	Saadia Maqsood KTP
R-0056F	Dissolved Oxygen - onsite reading	5.4	g O2/m³	Lizzie Addis (Transcrpition)

Comments:

Sampled by customer using ELS approved containers.

Test Methodology:

Test	Methodology	Detection Limit
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total Kjeldahl Nitrogen	APHA Online Edition 4500-N(org) B	0.8 g/m³
Nitrite Nitrate Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I.	0.005 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion follows APHA Online Edition 4500-P B.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion follows APHA Online Edition 4500-N C.	0.05 g/m³
Faecal Coliforms	APHA 9222D:Online Edition	1 cfu/100ml
Dissolved Oxygen - onsite reading	APHA Online Edition Method 4500-O G. Field measurement.	1 g O2/m³

Unless otherwise stated, all tests are performed in Wellington.

"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

g/m3 is the equivalent to mg/L and ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not IANZ", which are outside the scope of this laboratory's accreditation.

REPORT

TO: Chief Executive

FOR: Upper Selwyn Huts Community Meeting

FROM: Asset Manager Water Services

DATE: 12 April 2017

SUBJECT: **Upper Selwyn Huts Wastewater Options**

---

1. RECOMMENDATION

It is recommended that:

(a) This document is used to facilitate discussion on the future of the Upper Selwyn Huts sewer scheme.
(b) The Upper Selwyn Huts owners make a submission to the 2017/18 Annual Plan

2. PURPOSE

The purpose of this report is to provide Hut owners with a summary of information relating to the current and potential wastewater servicing of Upper Selwyn Huts.

3. SIGNIFICANCE ASSESSMENT/COMPLIANCE STATEMENT

This matter has been assessed against the Significance and Engagement Policy:

Consideration has been given to criteria set out in the policy, including:

- the magnitude of the net costs of the proposal or decision to the Council and / or to affected communities or groups
- the level of community interest in the proposal, decision or issue
- the values and interests of Ngāi Tahu whānau, hapū and rūnanga, as mana whenua for the region

On this basis the matter is considered to be of high significance.

It is recommended that initial informal engagement with the community is undertaken at the level of Informing/Consulting the community during the 2017/18 Annual Plan process with more specific consultation during the 2018-2028 Long Term plan.

4. HISTORY/BACKGROUND

Selwyn Huts is a settlement of 98 dwellings of which historically up to 12 could be permanently occupied. The new lease agreement allows for permanent occupancy. The settlement is located on Council reserve land and the day to day operation of the settlement is managed by the council.

The Selwyn Huts reticulated sewerage scheme was initially installed in the 1920s with the effluent from the septic tank discharged into the Selwyn River. A new sewage treatment and land disposal scheme was constructed in 1988. A schematic of how the current wastewater system operates is included in appendix 1.

Records indicate that the original scheme(s) was funded by the hut owners / lease holders.

Based on records received, there is a strong correlation between winter groundwater levels/rainfall and increased sewage flows into the ponds. Given the sustained periods of elevated winter sewage flows, the major component is infiltration i.e. leaky pipes.

The huts area is low lying and any upgrade option needs to take into account future lake levels. Refer Aqualinc Climate variation Report appendix 2 and Historic flooding images appendix 3

The existing wastewater consent expires in 2020. In order for that consent to be renewed, there are potentially significant enhancements which will need to be undertaken. The MWH report appendix 4 and ecoEng Brief Report appendix 5 references a number of management and upgrade options. The main options are summarised as follows:

- Do nothing
- Replace the existing collection reticulation system
    - Gravity sewer
    - Gravity sewer and six pump stations
    - Pressure sewer
- Install a package treatment plant
    - 60m ecoTrench + 4800m2 drip irrigation
    - 320m ecoTrench
    - 20,000m2 drip irrigation
- Transfer flows to treatment at the Pines Wastewater Treatment Plant
- Increase existing pond volume

There is a strong indication from hut owners that pumping to Lincoln is the most favourable long term option with a package plant being the second preference. With either option, renewal of the wastewater reticulation network will be required.

5. PROPOSAL

Upgrade Proposal

Reticulation. Due to the age and condition of the sewer, shallow depth of groundwater and proximity to the lake, it is recommended that the reticulation network is replaced.

Treatment. Following initial consultation with hut owners, treatment / disposal options were narrowed down to either onsite enhanced treatment or pumping of waste to ESSS sewer network.

Consultation Proposal

That the 2017/18 Selwyn District Council Annual Plan signal the intent to progress consideration of an upgrade to the Upper Selwyn Huts sewer scheme.

The intention is to seek initial informal public feedback on the wider community's desire and willingness to pay for a reticulated sewer scheme to be constructed for Upper Selwyn Huts.

Any proposal to include a reticulated scheme in Councils budgets would then be subject to full consultation via the 2018-28 Long term plan and / or specific special consultation on its own.

6. OPTIONS

Reticulation upgrade.

Ref	Options	Cost (GST Excl)
a.	Gravity sewer and six pump stations	$1,128,680 ($806,200 + 40%)
b.	Gravity sewer	$1,500,000
c.	Pressure sewer	$1,690,000 ($1,300,000 + 30%)

Further work is required to identify the optimum solution. For budgeting purposes, a cost of $1,500,000 is assumed.

Treatment options

Ref	Options	Cost (GST Excl)
a.	Land Application - 60m ecoTrench + 4800m2 drip irrigation	$1,281,000 ($985,400 + 30%)
b.	Land Application - 320m ecoTrench	$1,893,700 (1,456,700 + 30%
c.	Land Application – 20,000m2 drip irrigation	$1,210,000 ($930,800 + 30%)
d.	Pump to ESSS	$3,784,800 ($2,911,400 + 30%)

The preferred options are either (a) or (d)

Consultation Options

The options available are:

(a) Undertake initial, informal engagement under the 2017/18 Annual Plan process, followed by formal consultation under the 2018-2028 Long Term Plan;
(b) Defer any community consultation until the 2018-2028 Long Term Plan;

Option (a) is the preferred option and has been approved by Council.

7. VIEWS OF THOSE AFFECTED/CONSULTATION

a) Views of those affected

At the 1 August 2016 meeting, hut owners heard the perspectives of Environment Canterbury, and Te Taumutu Rūnanga representatives on environmental and cultural issues associated with proposed identified options.

Following a period of discussion, there was a strong indication from hut owners that pumping to Lincoln was the most favourable long term option with a package plant being the second preference.

This was balanced with some concern over costs and a perception that Council should be funding more of the costs.

b) Consultation

Further consultation will be required with Hut owners, Councillors and the wider community.

c) Maori implications

The development of a new wastewater scheme, if it goes ahead, would be of particular interest to local Rūnanga. Waste management is covered in the 'Mahaanui Iwi Management Plan' the document identifies Issue P7: There are specific cultural issues associated with the disposal and management of waste.

8. RELEVANT POLICY/PLANS

The proposal to consult on this matter is not inconsistent with Councils Policy's and Plans. Consenting and construction will be undertaken in accordance with relevant District and Regional planning provisions.

9. COMMUNITY OUTCOMES

This proposal supports the community outcome of 'Air, land, water and general environment to be kept in a healthy condition.' – 'Provide sewerage systems that minimise the negative effects of the activity.'[1]

10. NEGATIVE IMPACTS

No negative environmental impacts or effects were identified that cannot be appropriately mitigated or minimised. There are cost implications which are further discussed in section 12 below.

11. LEGAL IMPLICATIONS

No legal implications have been identified in relation to this proposal.

12. FUNDING IMPLICATIONS

Commentary

Currently licence holders pay an annual licence fee of $582.00 for general reserve maintenance, wastewater operation and maintenance, and water operation and maintenance.

The annual lease fee is $582 and is roughly broken down as follows:

Sewerage	$218
Water	$141
Reserves	$224
Total	$582

Based on preliminary numbers and certain assumptions:

- If the view of the licence holders was to pursue the option to install a package treatment plant, the annual licence fee would increase to $1,984 ($582-$218+$1620). However, this is not recommended due to the impact infiltration would have on the package treatment plant.

- If the option to replace the existing collection system was included, that fee would indicatively increase to $3,535 ($582-$218+3,171) per annum.

- If the licence holders were of a view to pursue the more expensive option to transfer flows to treatment at the Pines Wastewater Treatment Plant, which would require an indicative capital investment of $5.3m (including reticulation renewal), the individual annual cost for licence holders would be in the vicinity of $6,368.00 ($582-$218+$5,462+$542).

[1] Selwyn District Council Long-Term Plan 2015-25

- If the licence holders were able to gain the agreement of Council to include them into the District wide wastewater rating policy, those indicative figures would reduce to $906.00 ($582-$218+$542) or $979 ($224+542+$213) if District wide water was also utilised.

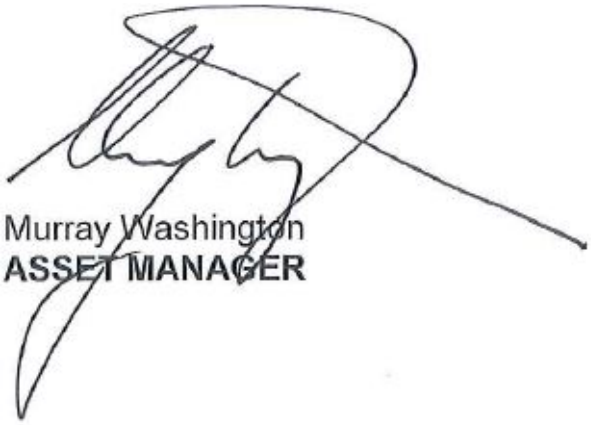
- Council has not yet considered the impact of Developer Contributions on the cost of the option pumping to the Eastern Selwyn Sewer Scheme (ESSS).

13. HAS THE INPUT/IMPACT FROM/ON OTHER DEPARTMENTS BEEN CONSIDERED?

This report has been developed in conjunction with the Corporate Services Manager as income accounts and rating will be affected.

Murray England
ASSET MANAGER, WATER SERVICES

ENDORSED FOR DISCUSION



Attachment 1 – Scheme schematic

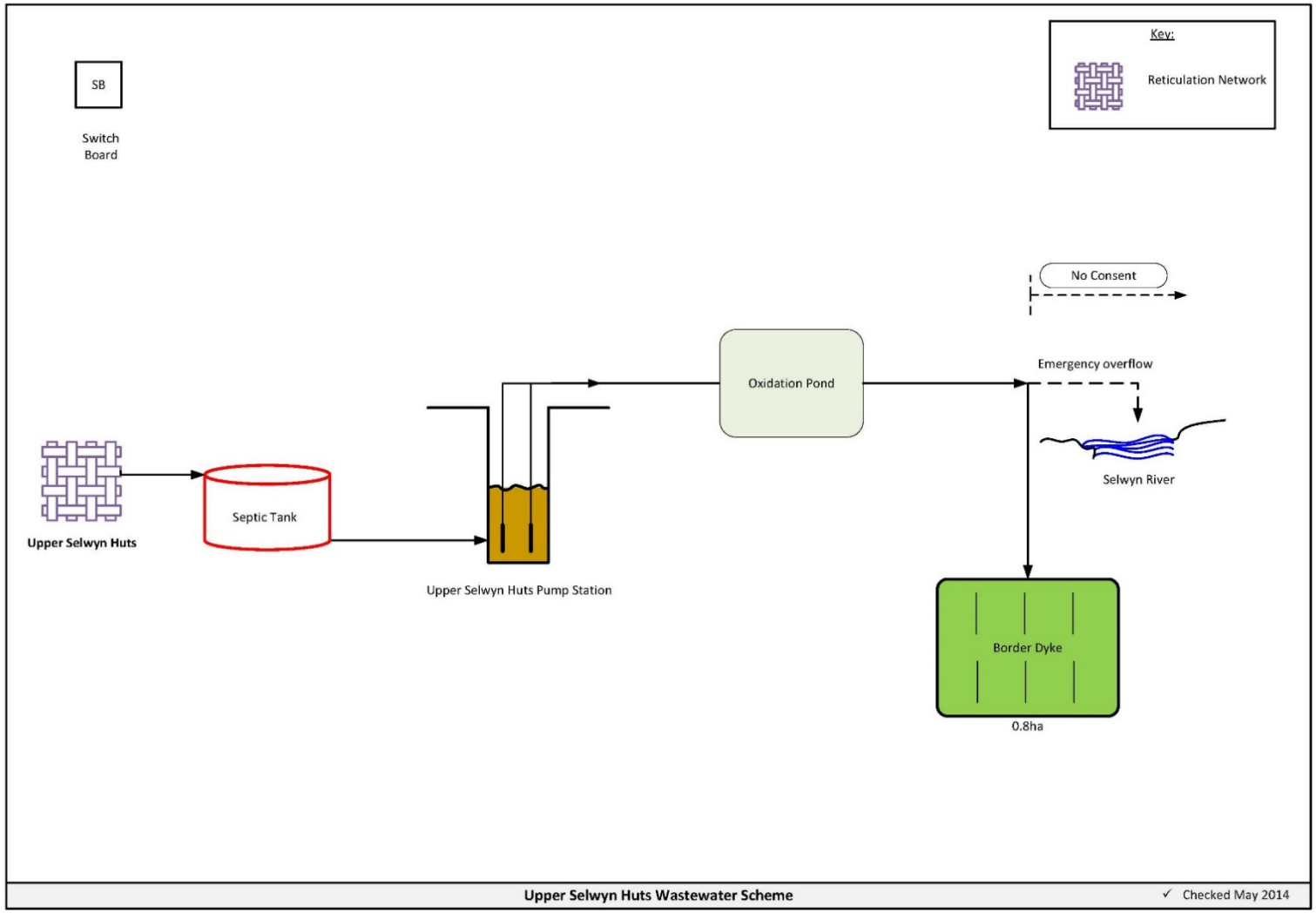
Attachment 2 – Aqualinc Climate variation Report

Attachment 3 – Historic flooding images

Attachment 4 – MWH Report

Attachment 5 – ecoEng Brief Report

Attachment 1 – Scheme schematic



Attachment 2 – Aqualinc Climate variation Report

AQUALINC

Climate variation REPORT

IMPACT OF CLIMATE CYCLES AND TRENDS ON SELWYN DISTRICT WATER ASSETS

PREPARED FOR
Selwyn District Council

C16049

May 2016

PREPARED BY
Peter Brown
Tim Kerr
Julian Weir
Ayaka Kashima

www.aqualinc.com

13.3 Selwyn Huts

A higher lake level in Te Waihora would result in more frequent flooding of lower Selwyn Huts, and would reduce the times when borderdyke irrigation of Upper Selwyn Huts wastewater can occur.

The lower Selwyn Huts are already prone to flooding. Figure 30 illustrates that the settlement was entirely underwater on 30 June 2013, when lake levels rose to 1.8 m amsl. Sea level rise has the potential to increase the frequency and magnitude of flooding.

The upper Selwyn Huts are less prone to flooding than the lower huts. However the wastewater system uses border dyke irrigation for effluent disposal. When lake levels are high irrigation cannot occur. Figure 31 and Figure 32 illustrate the difference that a 0.23 m rise in lake level would have had on the 30 June 2013 event. This is the worst case scenario for sea level rise over the next 32 years. Actual impacts could be significantly less.

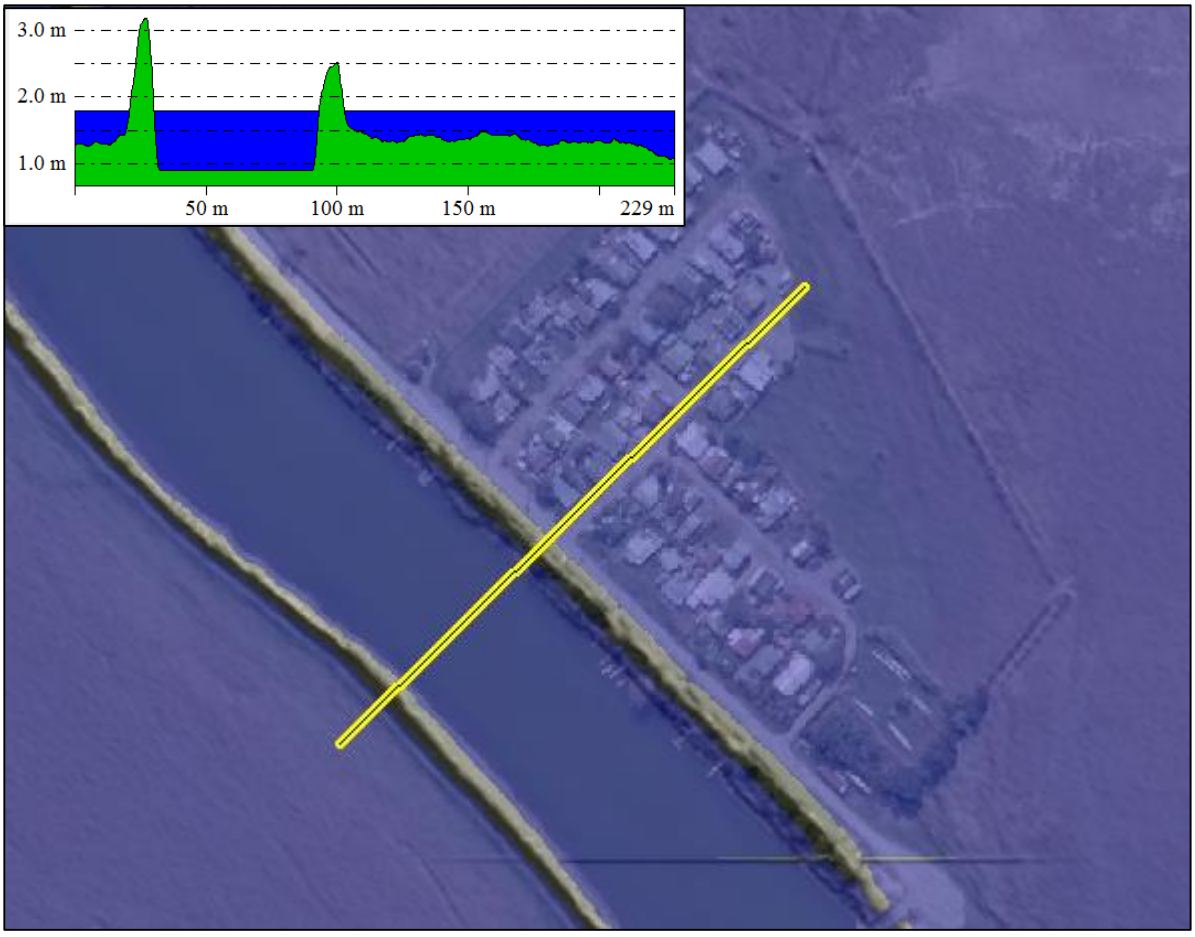


Figure 30: Lower Selwyn Huts with a water level of 1.8 m amsl

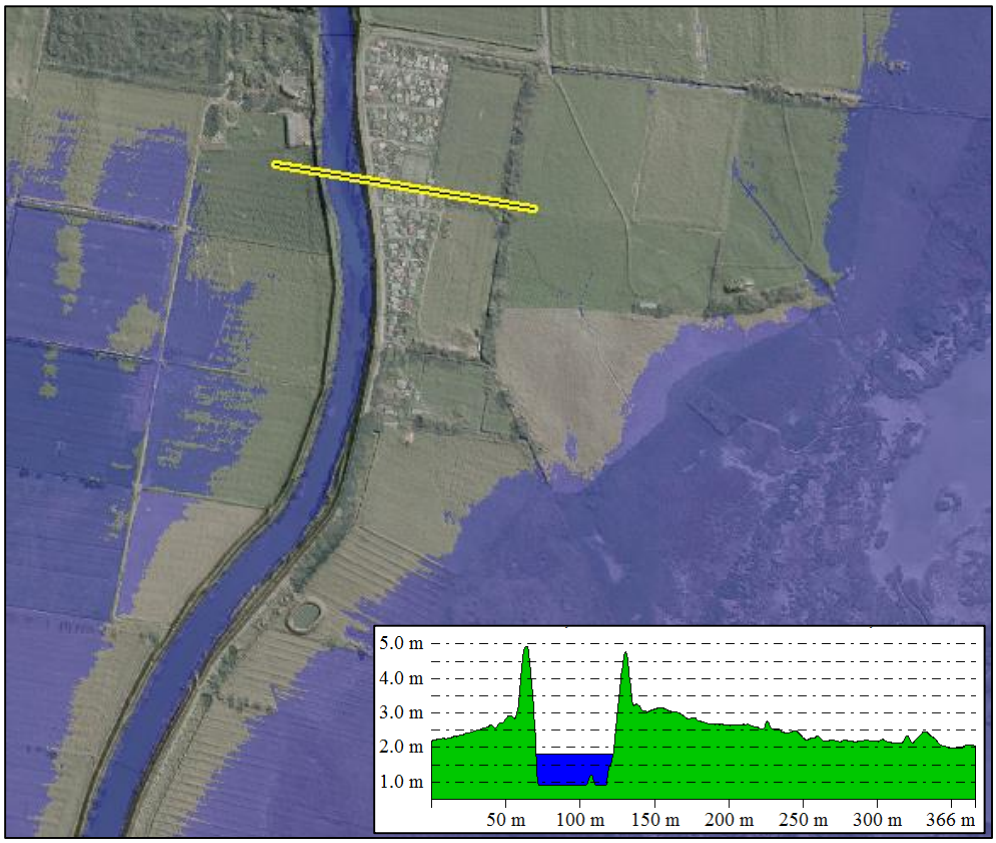


Figure 31: Upper Selwyn Huts with a water level of 1.8 m amsl

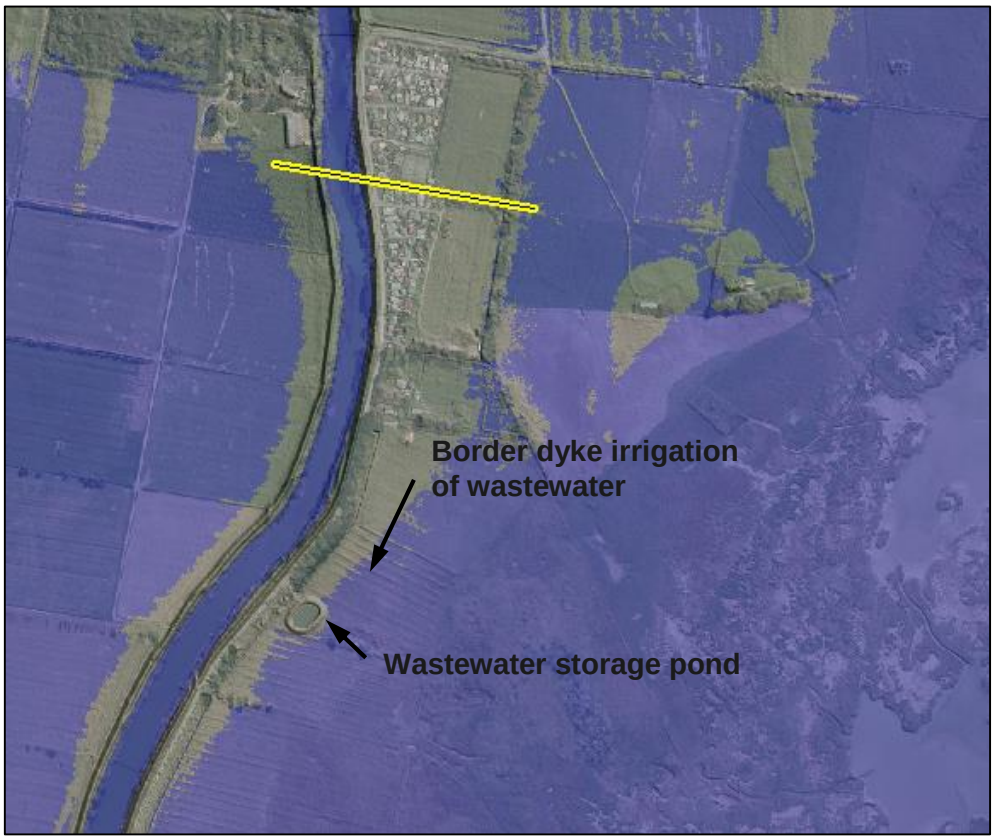


Figure 32: Upper Selwyn Huts with a water level of 2.03 m amsl

Attachment 3 – Historic flooding images

702. Selwyn River. Pannetts Road on left. (East) **24/08/1986**

01 SEP 1992

414 Lake Ellesmere and Selwyn River (North)

523

523 Selwyn Huts centre left (South) 30/08/1992

500 Selwyn River at Selwyn Huts (East) 28/07/1994

216 Upper Selwyn Huts with overflow in background (west) **20/08/2000**

0747 - Selwyn River Mouth (south-east) - 23-06-2013

Attachment 4 – MWH Report

Upper Selwyn Huts Sewerage

This report has been prepared for the benefit of Selwyn District Council. No liability is accepted by this company or any employee or sub-consultant of this company with respect to its use by any other person.

This disclaimer shall apply notwithstanding that the report may be made available to Selwyn District Council and other persons for an application for permission or approval or to fulfil a legal requirement.

Rev. No.	Date	Description	Prepared By	Reviewed By	Approved By
1	14-01-16	Final	K Thorpe	S Bishop	C Maguire

1 Aim

MWH was engaged to provide an assessment of the existing sewerage scheme and to evaluate options for alternative configurations to address issues associated with apparent high levels of inflow & infiltration (I/I) and consenting for wastewater discharges.

Methodology:

- Commentary on planning limitations for the sewerage scheme and for options that may be considered.
- Desktop based assessment of options supplementing initial site walk over. Options to consider include:
    - Status Quo: what would be the implications? What would revised consent conditions likely entail?
    - Upgrading Existing Scheme: what enhancements would be required to the existing scheme to comply with consent conditions?
    - Renewal of Collections System: would pressure over gravity system resolve concerns on a flow basis?
    - New Scheme configuration; would a package treatment system with treated effluent discharge to the reserve or existing disposal field be viable?
    - Treatment via ESSS; would pumping to Lincoln or carting waste to Pines WWTP be viable?
- Reporting on options, including initial cost estimates for options, commentary on project risks, and any additional recommended investigations.
- Presentation of report outcomes via a meeting at SDC office to staff, with the inclusion of representatives from Iwi and/or Upper Selwyn Huts residents.

2 Background

Selwyn Huts is a settlement of 92-100 dwellings positioned on leased land which is managed by Selwyn District Council. The dwellings were initially used as fishing cottages. Currently up to 19 can be permanently occupied.

Selwyn Huts sewerage scheme was initially installed in the 1920s with a septic tank and overflow discharge to the Selwyn River. The system was upgraded in 1988 by adding a pumping chamber to the septic tank, which discharges to an oxidation pond located south east of the township. A border dyke irrigation system was added, which discharges to 0.88 hectares of grassed land.

Figure 2-1 shows the extent of the sewerage system and Figure 2-2 shows a schematic of the system.

Figure 2-1: Selwyn Huts Sewerage System

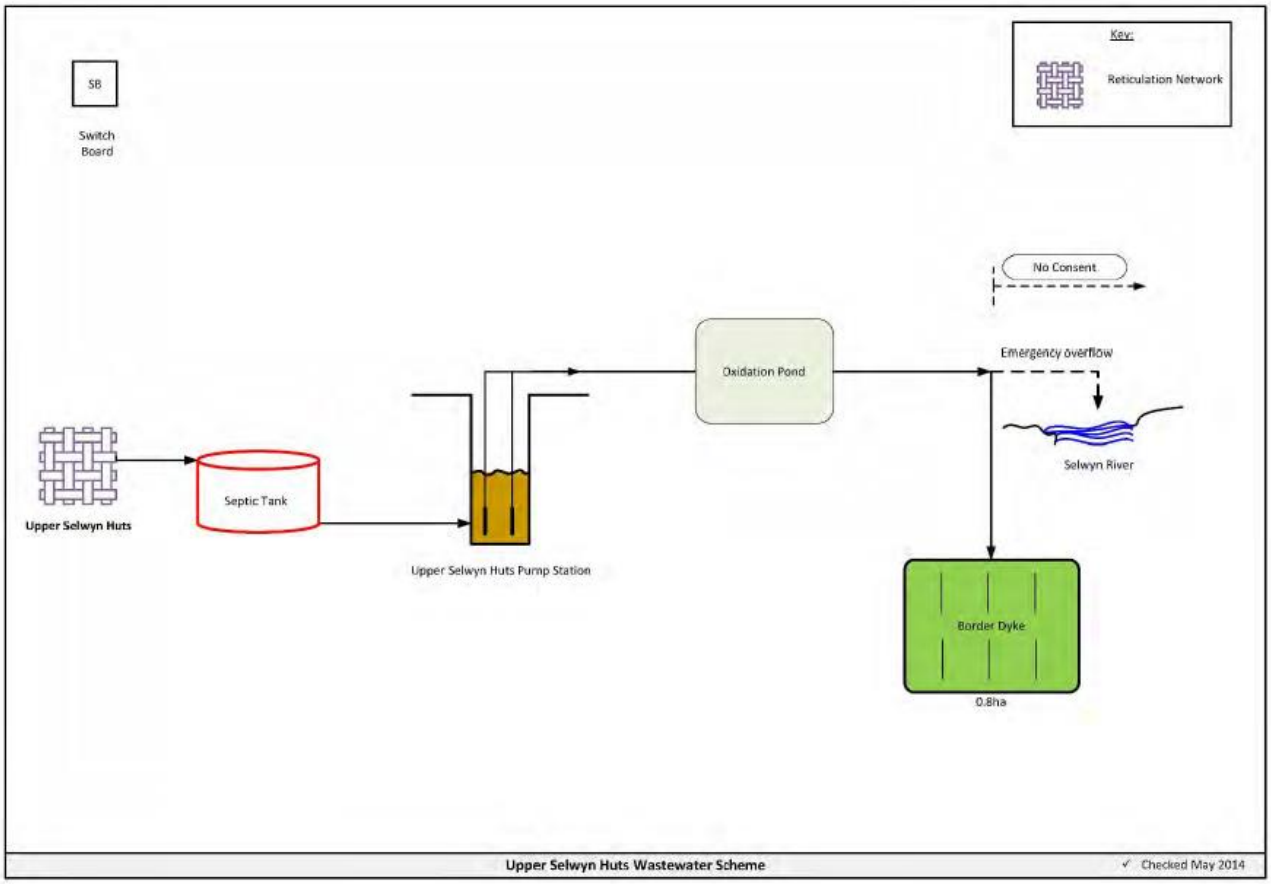


Figure 2-2: System Schematic

The consent initially allowed for emergency overflow to the Selwyn River. In recent years the sewerage network has exceeded the allowable discharge limit of 650m³/month on more than one occasion.

Selwyn District Council are currently looking at the future options for the sewerage system.

3 High Level Options Assessment

The following section discusses the various high level options that have been discussed for the Upper Selwyn Huts Sewerage system. These options are **draft** only. All costs are based on high level estimates only and are not to be used for anything other than high level cost comparison.

The options are summarised below, followed by further discussion of each.

1. Do nothing
2. Replace existing collection system
3. Install package treatment plant
4. Transfer flows to treatment at Pines WWTP
5. Increase existing pond volume

3.1 Do Nothing

The current consent for Upper Selwyn Huts WWTP discharge (CRC991634) expires on 20 June 2020 (attached). A replacement consent for this discharge would therefore need to be lodged with ECan by 20 Dec 2019 at the latest to ensure continuation of the activity while a decision on the new consent is being made.

Our understanding is that Selwyn District Council (SDC) seeks an understanding of the recent consenting rules and how they might apply to a new consent for the current discharge. We also understand that there is an issue with exceeding the current discharge volume limit of 650 m^3 per month.

The rules in the Land and Water Regional Plan (LWRP) are now the operative rules to consider in respect of discharges of wastewater to land. In addition, Plan Change 1, relates specifically to the Selwyn-Te Waihora catchment and has additional rules which need to be considered.

Rule 5.84 in the LWRP is the relevant rule requiring consent as a discretionary activity for the use of land for a community wastewater system and treated wastewater discharges to land from that system. The discharge is not located within a drinking water protection zone so is not classed as prohibited. Supporting Policy 4.39 allows for discharges of wastewater from community schemes where it falls within the nutrient limits. The nutrient limits for the catchment as a whole are currently not being met, so any increase in nutrient discharges would be harder to obtain a consent for.

Plan Change 1 (PC1) includes several additional policies and rules with more of a focus on nutrient management within the catchment. PC1 also classifies the area which Upper Selwyn Huts is located as the Te Waihora Cultural Landscape/Values Management Area (CLVMA - see map attached). The following policies are particularly relevant for consideration in any new application. Currently these policies have less weight than those in the LWRP as they are not fully operative, however, by the time any new application is lodged they will likely be operative.

- Policies 11.4.3 and 11.4.4 focus on management of the CLVMA for mahinga kai/cultural values/restoration of lake health/sensitivity to discharges.
- Policy 11.4.6 aims to reduce the total nitrogen load into the catchment in accordance with Tables 11(i) and 11(j). Table 11(i) sets a total limit of 62 t/yr of N from community sewerage systems. The current load is 38 t/yr of N (as identified in the s32 report for PC1 in sections 5.9 and 10.3, with reference to report R13/8 by Loe (2013)). This therefore leaves some room for future population growth of the five systems located within the catchment. It is also stated in the s32 report that the estimates of future N losses for the community sewerage systems within the zone was provided by SDC in 2013. This has then formed the basis for the limits in Table 11(i). Therefore these limits should not be too much of an issue for SDC to comply with if the total N losses going forward from the Upper Selwyn Huts system is in line with the 2013 predictions.
- Policy 11.4.7 requires SDC to adopt the best practicable option for the discharge in order to meet the load limits.
- Policy 11.4.8 only allows any exceedance of the community sewerage system limit if the cumulative discharge from individual systems would be more.
- Policy 11.4.9 makes it clear that there shall be no direct discharge to surface water or groundwater of treated wastewater within the CLVMA.

The relevant rules are Rule 11.5.22 which requires consent as a discretionary activity if the cumulative nitrogen load does not exceed the values in Table 11(i) and the best practicable option is used. If these matters cannot be complied with, then a consent under Rule 11.5.23 as a non-complying activity would be necessary and this is a much harder threshold to pass.

Based on these policies and rules we do not consider there is a significant barrier to continuing to discharge at the current site. However, careful consideration of the actual versus previously consented N losses will be important to ensure no increase above the limit identified in Table 11(i) particularly as the current volume of

the discharge is exceeding the consented limit. Also included in any application should be a sufficient assessment of the effects on cultural values (particularly as this discharge is within the CLVMA) including evidence looking at the levels of N in groundwater downstream of the discharge that will be contributing to the elevated nutrient levels of nearby streams and the lake. There will also need to be justification of why the system proposed represents the best practicable option to meet the load limit.

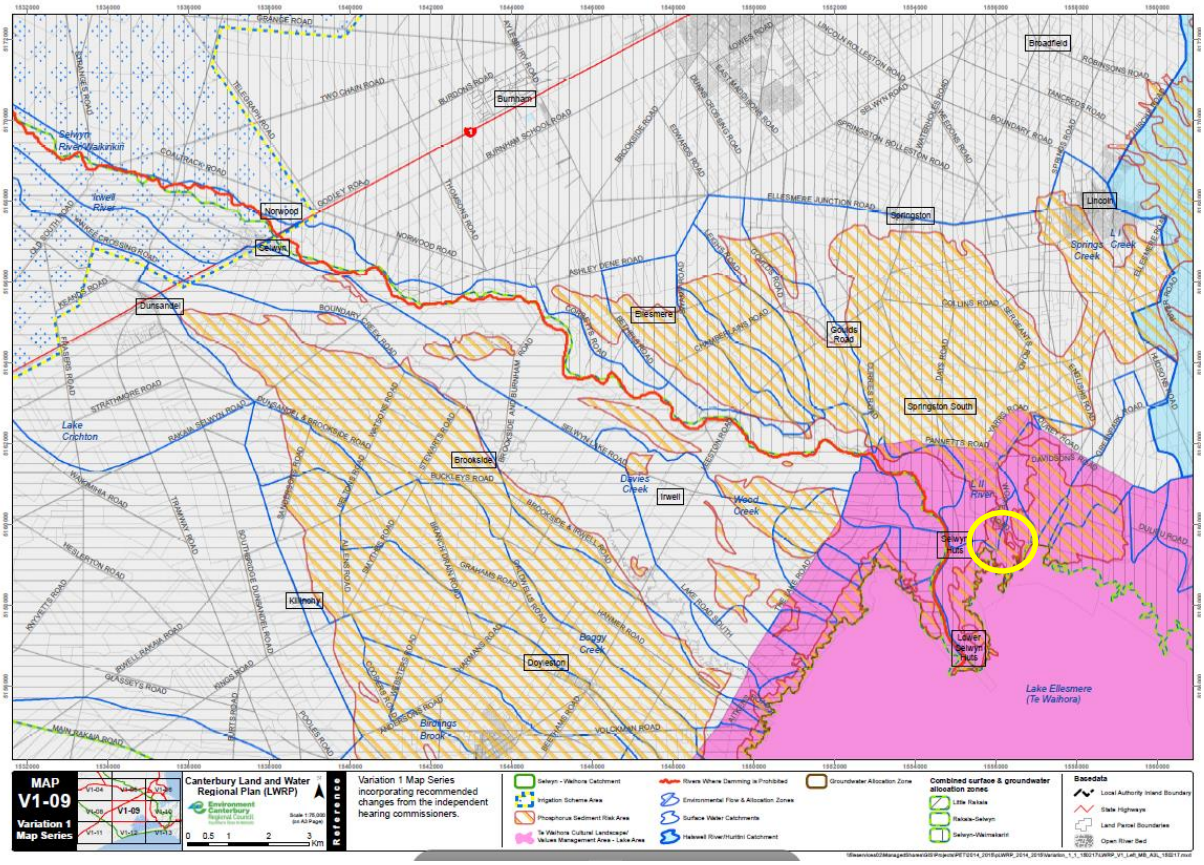


Figure 3-1: Proposed Map V1-09 from Plan Change 1 to the Land and Water Regional Plan.

*Cultural Landscape/Values Management Area shown in pink.

**Upper Selwyn Huts location identified in yellow circle.

Summary:

Do Nothing is not viable as it does not address the exceedance of daily volumes in peak periods as defined under the existing resource consent. Changes to these conditions are not likely to be accepted if applied for under a new application.

The current treatment process meets the nutrient loading requirements however steps still need to be taken to identify that this is the best practicable option for the discharge in order to meet the load limits. Also, ongoing monitoring will still be required.

3.2 Replace Existing Collection System

Under this option the existing collection system would be replaced with the existing treatment configuration maintained.

Where Inflow & Infiltration (I&I) forms a significant percentage of the wastewater flow, then new infrastructure, or repairs to the existing infrastructure, can reduce the total daily flow volume. The trend of SDC's records of the past 8 years suggest that I&I may be an issue, but further investigation (e.g. correlation against rainfall records) needs to be undertaken to confirm the quantum of the problem.

A programme of investigation, removal of illegal connections and asset replacements has a high chance of reducing the amount of I&I, but it is unlikely to eliminate it completely.

Rough order costs for a replacement gravity system are as follows:

- Total length of wastewater infrastructure is approximately 1.5-2km, approximately 1.8km.
- Cost of full like for like gravity replacement at say $750/m plus ancillaries: $1.5M

If the effect of I&I can be demonstrated more completely, and the benefit (in terms of flow reduction) quantified, then a cost benefit/analysis can be undertaken on these costs. However, we would anticipate that it is unlikely the capital expenditure could be justified.

Pressure sewer systems are an alternative option for reducing I&I in the network and to provide capacity for flow balancing. The pressure sewer system consists of a chamber which contains a macerating pump and a small diameter pressure pipeline. The capital cost of pressure sewer systems for individual houses are in the region of $10,000 per property plus indirect costs. The operational costs incurred include year maintenance (assumed $50-$100 per property per year) and power usage ($25 per property per year).

Rough order costs for a pressure sewer system based on approximately 100 houses are:

Table 3-1: Pressure Sewer System Rough Order Costs

Details	Per Property	Per Scheme (assume 100 houses)
Capital Costs:	$10,000	$1,000,000
P&G (30%)	30%	$300,000
Operational Costs ($100 per year over 30 years):	$3,000	$300,000
Contingency (30%)	30%	$480,000
Total		**$2,080,000**

*Costs are based on Review of Parklands East Pressure Sewer System Operating Costs for Christchurch City Council (2013)

The installation cost rate is likely to have reduced with the recent, increased deployment of pressure sewer systems in Canterbury. However the capital outlay is still considerable, as is the ongoing operation and maintenance.

3.3 Install Package Treatment Plant

Under this option the existing collection system would be maintained with the existing treatment configuration modified.

The oxidation pond effluent sampling exhibits relatively poor quality effluent that could be improved significantly by the provision of a small package treatment system such as those pictured below. However it is important to note that the system does meet the existing consent conditions for effluent quality.

Package Treatment systems are available in multiple configurations and technologies (generally some form of aerobic digestion followed by solids separation), and range in size from a large manhole to several shipping

containers, depending on the flow and load to be treated. Passive systems, with no running costs, are also available. Systems can be installed above or below ground, the latter tending to add to the cost.

Assuming the improvement in effluent quality can be predicted or quantified (even guaranteed), it should then be possible to renegotiate the consent conditions for a higher discharge rate.

Package Treatment Plants are usually selected and designed with the assistance of the manufacturer or supplier. For this reason we have not investigated package treatment plants in detail at this stage, but would expect the costs of installing a suitable system to be in the order of $500-750K.

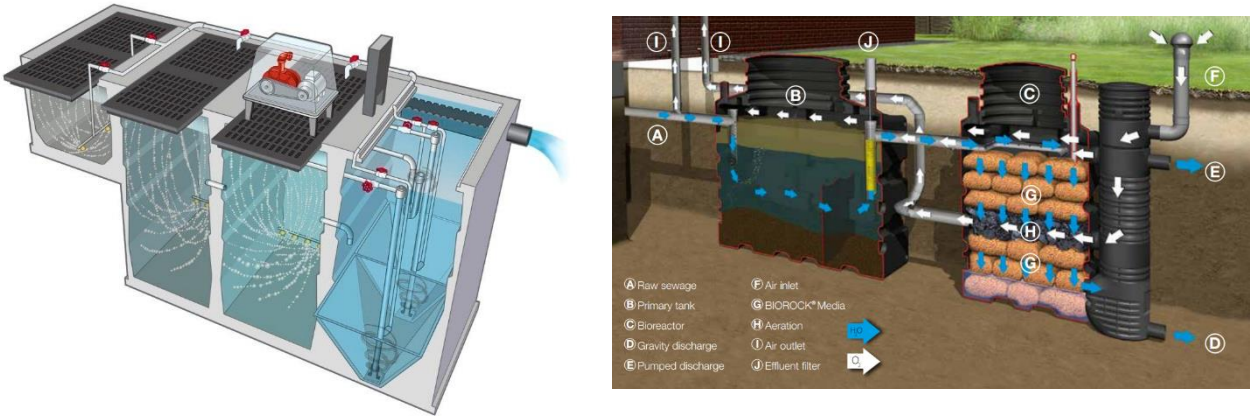


Figure 3-2: Examples of Package Treatment Systems

3.4 Pumped connection to ESSS system.

Under this option the existing collection system would be maintained with the existing treatment configuration modified. We have briefly considered two pipe alignments to transfer flows by pumping to Allendale Lane pump station in Lincoln.

Option 1: Following Road Alignment

11.6km - follows the road alignment, mostly in grass verge, until the end of Collins Road where it then crosses rural property to Lincoln.

Option 2: Crossing Private Land Boundaries

10.2km - slightly shorter but involves challenges re: private land, access, watercourse crossings, etc.

Note that an absolutely straight line route would be about 9km.

In each case a pump station of approximately 5l/s capacity is required. A suitable package pump station, such as the Xylem/Flygt TOP series (Fig. 6), is likely to be available.

Rough order costs for Option 1 are in the order of $3.8M, as outlined below. Option 2 costs are likely to be similar.

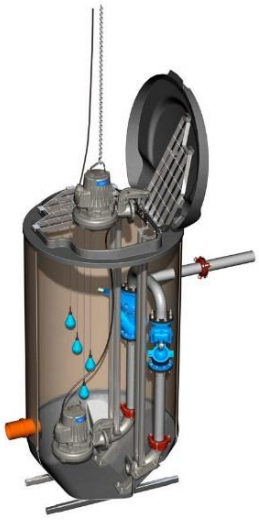


Figure 3-3: Flygt TOP package PS

Table 3-2: CAPEX of pumping wastewater to Allendale Lane

Task	Unit	Quantity	Rate	Total
Supply & Install DN100 PE Pressure Main	m	11,600	$175	$2,030,000
Supply & Install 5l/s Pump Station	LS	1	$250,000	$250,000
Subtotal				$2,280,000
Traffic Management			6%	$136,800
P&G			30%	$684,000
Contingency			30%	$684,000
TOTAL				**$3,784,800**

As well as the high capital costs, septicity is likely to be an issue. At an average discharge of 525m³ per month (just over 17m³ per day), the pipeline residence time is 4.3 days. This would be greater during periods of the year where the population of the community is lower. This may trigger odour and corrosion issues in the downstream network, which may therefore require additional or upgraded management systems.

We also envisage the low flow of 5l/s and/or long static periods may result in other operational problems e.g. blockages.

3.5 Cartage to Pines WWTP

Under this option the existing sewerage system would be maintained with the existing discharge conditions would be modified. We have estimated the cost of carting consent-exceeding flows away to an alternative treatment and disposal location (either direct to Pines WWTP, or to a suitable acceptance point on the ESSS system, e.g. Allendale Rd pump station) via a vacuum pump 'sucker' truck & tank unit. The existing pond has a capacity of 880m³.

The cartage costs have been identified in the table below for:

1. Option 1 – Carting All Wastewater (7043m³/year)
2. Option 2 – Carting Excess Wastewater (440m³ / year)
3. Option 3 – Buffering Removal (220m³/year)

Table 3-3: Annual Cartage Costs for Wastewater

	Removal	Trips	Disposal Costs	Cost/Truck Time	Total Cost/Truck
	m³	25m³ Truck	$45/m³	25m³ Truck @$220/hr (3hrs)	25m³ Truck
All Wastewater (annual)	7043	282	$316,935	$185,935.20	**$502,870**
Excess Wastewater	440	18	$19,800	$11,616	**$31,416**
Buffering Removal (25%)	220	9	$9,900	$5,808	**$15,708**

Assumptions:

- 3hrs/trip @ $220 per hour (1hr travel time each way, 1 hr to fill the truck)
- $45/m³ removed
- Rates are based on commercial septage costs

We note that the existing pond has a capacity of 880m³.

Option 1: Carting All Wastewater (7043m³/year):

The average discharge of all wastewater from 2012 to 2014 was 7043m³/year. The costs associated with carting all wastewater away from site is estimated as **$503,000 per year**.

A full removal has been identified as not feasible due to the costs and time it would take to drain the pond and the recharge issues associated with the long time to drain it.

Option 2: Carting Excess Wastewater (440m³ / year)

SDC's records show 27 of the past 94 months (just under 8 yrs) where the monthly discharge exceeds the consent maximum of 650m³. The sum of these exceedances is 3,500m³, or approximately 440m³/yr.

The costs associated with the carting of excess wastewater only is estimated as **$31,400 per year**.

Option 3: Buffering Removal (220m³/year)

The existing pond should be able to provide some month-to month buffer storage, this may mean that buffer removal may be suitable for maintaining the pond level.

Removals could be procured as required, or more strategically by draining the pond down ahead of upcoming wet weather / greater demand. However, this would require more monitoring and the buffering requirements will fluctuate throughout the year.

The costs associated with the carting of buffering 25% of pond volume is estimated as **$15,700 per removal**.

3.6 Increase Existing Pond Volume

Under this option the existing collection system would be maintained with the existing treatment configuration modified. The existing wastewater system is currently under capacity for its monthly consented flow. The existing connected properties and suspected I&I have contributed to not meeting the discharge consent conditions.

The cumulative discharge volume between Oct 2007 and Oct 2015 gives a total of 49,345m³ discharged over 94 months (SDC's records of discharge)[1]. This averages at 525m³ per month, 125m³ below the consent limit. The highest monthly discharge over the same period is 1,025m³, and the minimum is 176m³.

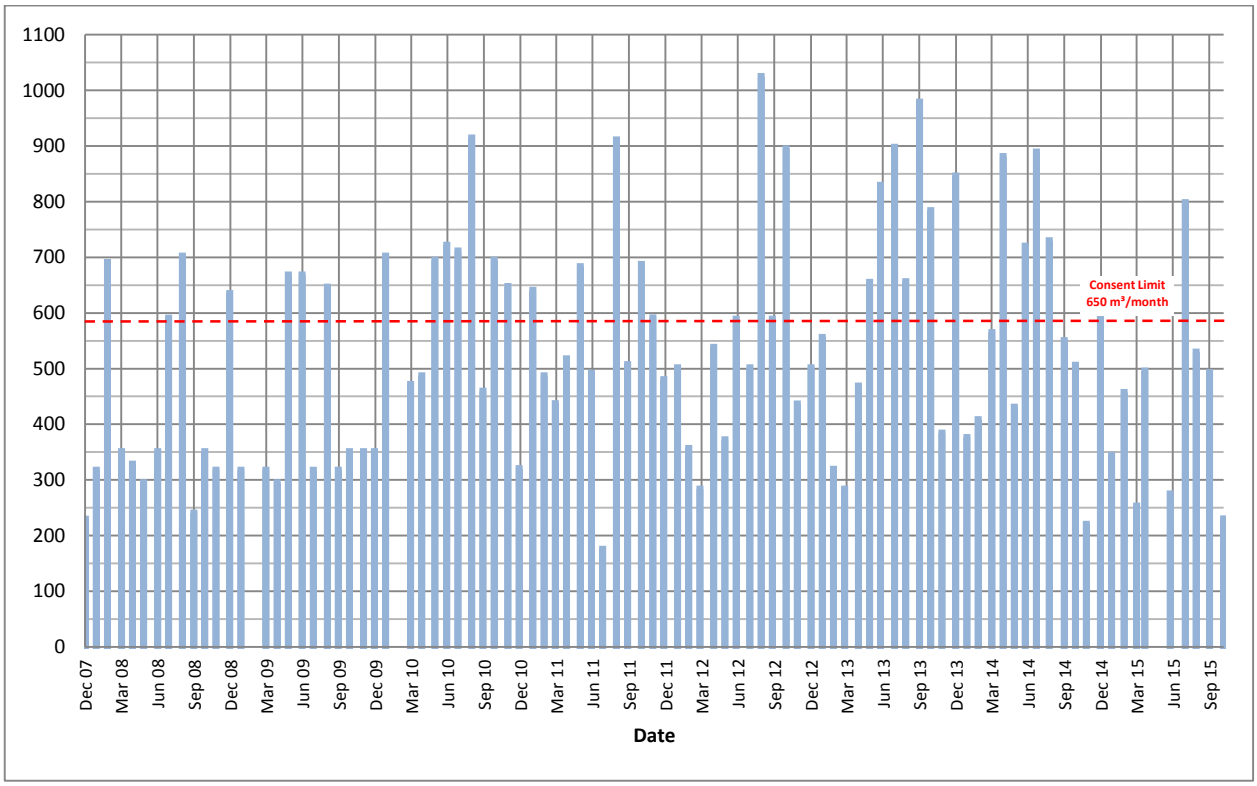


Figure 3-4: Selwyn Huts Monthly Wastewater Discharge, m³

[1] Two months are missing from the 8-year dataset.

These figures suggest that **flow balancing** may be a feasible management process, whereby flow is held in storage during a high flow month for later discharge during a low flow month. However, the existing pond volume will need to be increased in order to implement this.

In order to determine the optimum volume increase we would need to analyse the data further. However for this report we have assumed that the figure derived by Morrison[2] is accurate, and that the existing pond will need to be roughly doubled in size from 880m³ to 1590m³.

We assume that the additional storage can be procured for approximately $100/m³. Other costs (such as land procurement, P&G, engineering, contingency) will also be incurred. The increased footprint of the oxidation pond could be accommodated on the existing site.

Therefore we estimate the total cost of this option to be in the order of **$100 - $150K.**

4 Conclusions & Recommendations

We consider that:

- Doing nothing is not viable as it is unlikely an application to renew the existing discharge consent would be accepted.
- Replacing the existing collection system is cost prohibitive, and may not achieve the predicted reduction in flows. Proactive investigations and actions to isolate I&I would benefit any option finally implemented.
- Package treatment plants, although not as expensive as renewing the collection system, are still not the most cost effective solution.
- Connecting the system to the ESSS for treatment at Pines WWTP via a new pump station and rising main to Allendale Lane PS is cost prohibitive.
- Carting flows to the ESSS for treatment at Pines WWTP is potentially cost effective at a buffering level (i.e. 220m³/yr) may be feasible, but this method will require proactive monitoring and actions. It therefore still carries the risk of continued consent failures. Consent renewal may be declined on this basis.
- Increasing the existing pond volume is the preferred solution. It demonstrates proactivity to the consent authority and, provided a thorough design process is followed, should ensure the existing consent conditions continue to be met in future.

We recommend that

- Increasing the pond volume is carried into preliminary design to provide additional buffering of peak flows and increasing residence times for treatment.
- Discussions are held with Environment Canterbury to discuss the possibility of an increase in wet weather peak volume discharge and the acceptability of the preferred option.

Attached: Existing Consent Conditions

[2] *Preliminary on-site wastewater servicing report for Upper Selwyn Huts community* – K. Morrison PHD, Ecological Engineering Solutions Ltd, June 2011.

Environment Canterbury
Your regional council

58 Kilmore Street, Christchurch 8013 PO Box 345, Christchurch 8140
General enquiries: 03 365 3828 Customer services: 03 353 9007
Fax: 03 365 3194 or: 0800 EC INFO (0800 324 636)
Email: ecinfo@ecan.govt.nz Website: www.ecan.govt.nz

23 February 2010

Selwyn District Council
Attn: Ms Fiona Rayner
PO Box 90
Rolleston 7643

Dear Ms Rayner

RESOURCE CONSENT AMENDMENT
NUMBER: CRC991634 **NAME: Selwyn District Council**

An error has been identified in condition (1) of the above mentioned resource consent. The decision maker, who made the original decision, has assessed the error and is satisfied that the error can be corrected under the powers of section 13 of the Interpretations Act 1999. Therefore condition (1) has been corrected.

Please destroy the documents currently in your possession and replace them with those enclosed. All the original attachments (i.e. any maps, pamphlets etc) are still valid.

For all queries please contact our Customer Services Section by telephoning 03) 353 9007, 0800 ECINFO (0800 324 636), or email ecinfo@ecan.govt.nz quoting your CRC number above.

Yours sincerely

Carly Steers
TEAM LEADER CONSENTS OPERATIONS

Our Ref: ***CO6C/15443***
Your Ref:
Contact: ***Customer Services***

Reissue new docs: Sect 13Int
Rev August 2007

RESOURCE CONSENT CRC991634

Pursuant to Section 104 of the Resource Management Act 1991

The Canterbury Regional Council (known as Environment Canterbury)

GRANTS TO:	Selwyn District Council
A DISCHARGE PERMIT:	To discharge oxidation pond effluent onto land.
DATE DECISION:	20 June 2000
EXPIRY DATE:	20 June 2020
LOCATION:	Days Road, SELWYN HUTS

SUBJECT TO THE FOLLOWING CONDITIONS:

1) The total volume of treated effluent discharged ("the Discharge") onto land shall not exceed 650 cubic metres per month.

2) Two monitoring bores (GW1 and GW2) shall be installed at the site within two months of the granting of this consent. GW1 shall be located upstream of the border dyke area (in terms of the unconfined water table flow direction) and GW2 shall be located downgradient (in terms of the unconfined water table flow direction) and within 20 metres of the border dyke irrigation area. Both bores shall be drilled to a depth of five metres below the water table as determined at the time of drilling.

3) A record of each discharge event that occurs to the border dyke area shall be kept and provided to the Canterbury Regional Council on request. This record shall include:
   (a) the date of the discharge; and
   (b) the duration of the discharge in hours; and
   (c) the volume of the discharge; and

4) The application of the discharge to the border dyke irrigation area shall not result in runoff from this area.

5) The discharge shall be treated in a two cell oxidation pond ("the Pond"). Positive dissolved oxygen should be maintained in the Pond.

6) All entrances to the site, which comprises the sewerage treatment system and the borderdyke irrigation area ("the Site"), shall be securely locked when the Site is not supervised to prevent as far as practicable unauthorised access.

7) A warning notice shall be erected within 10 metres of the gate on the boundary fence bordering the road. The notice shall state: "Danger - Sewage Discharge". The notice shall be capable of being read at a distance of five metres.

8) There shall be no grazing on the border dyke irrigation area for a period of three days after each discharge event.

9) The discharge shall not cause an odour which is determined to be offensive or objectionable beyond the property boundary of the consent holder.

10) (a) A maintenance service contract, which provides for a written field service report on the maintenance of the sewage treatment system and the border dyke irrigation system, shall be maintained with a competent person. The contract shall require:

(i) at least three monthly maintenance of the pump, screen vault, the Pond and border dyke irrigation area.

(b) Copies of the field service reports shall be maintained and provided to the Canterbury Regional Council on request.

11) The discharge shall be sampled quarterly, at a site as close as practicable to the Pond outlet, and samples shall be analysed for the following determinands:(a) Dissolved oxygen(b) Faecal coliforms(c) Suspended solids(d) Total phosphorus(e) Total nitrogen

12) Groundwater shall be sampled monthly in two wells specified in condition (2) for an initial 12 month period and thereafter at six monthly intervals, and analysed for the following determinands:(a) Nitrate nitrogen(b) Ammoniacal nitrogen(c) Faecal coliforms(d) Total phosphorus(e) Conductivity(f) the depth of groundwater measured in bores GW1 and GW2.

13) The laboratory carrying out the analyses for the purposes of conditions (11), and (12) of this consent shall be accredited for determinand analysis by an independent body to a standard equivalent to ISO Guide 25.

14) The consent holder shall submit to the Canterbury Regional Council by the last working day of the following month any results of analyses of samples which it obtains during any month under conditions (11) and (12).

15) If under condition (12), the mean of the last four results for bore GW2 shows nitrate-nitrogen or phosphorus concentrations in excess of two grams per cubic metre above that shown for bore GW1, then the Canterbury Regional Council may request that the consent holder submit to it within 20 working days a written report. This report shall include an assessment of the extent and nature of that contaminant and if it is associated with activities authorised by this consent then include recommendations on any actions to be undertaken by the consent holder.

16) There shall be no discharge to areas where there is standing water, including ponded rain water or ponded discharge, or under circumstances where the discharge is likely to cause ponding for longer than 24 hours.

17) The Canterbury Regional Council may annually, on the last working day of November, serve notice of its intention to review the conditions of this consent for the purposes of:(i) dealing with any adverse effects which may arise from the exercise of this consent and which it is appropriate to deal with later; or(ii) requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or(iii) complying with the requirements of a relevant rule in an operative regional plan.

18) Charges, set in accordance with section 36 of the Resource Management Act 1991, shall be paid to the Regional Council for the carrying out of its functions in relation to the administration, monitoring and supervision of resource consents and for the carrying out of its functions under section 35 of the Act.

Issued at Christchurch on 23 February 2010

Carly Steers
TEAM LEADER CONSENTS OPERATIONS
on behalf of the Canterbury Regional Council

Environment Canterbury is the promotional name of the Canterbury Regional Council

Attachment 5 – ecoEng Brief Report

Ecological water and wastewater engineering

63 Bowenvale Avenue,
Christchurch, New Zealand
Ph (64) (3) 942 7954
Mobile: (64) 021 533386

Email: andrew@ecoeng.co.nz
Website: www.ecoeng.co.nz

Cluster Domestic Wastewater Management Service
Selwyn Huts, Canterbury
Options, Design and Costing – brief report

25 January 2017

1 ecoEng brief

ecoEng Limited has been engaged by Selwyn District Council to provide a *two page memo with a drawing or product data* for a cluster domestic wastewater management service for Selwyn Huts village. The requested report outputs were; *cost of system, type of treatment system, type of disposal field, size of disposal field.* (Ref. emails, Murray England, 23 January 2017).

ecoEng acknowledges the cost details and technical advice received from All About Sewage (AAS) Ltd.

2 Site constraints and attributes

2.1 Constraints

- Community water supply protection zone (Refer to **Appendix A**, **Figure A3**)
- Located within the Te Waihora Cultural Landscape/Values Lake Management Area
- High ground water levels
- Flooding risk
- Variable seasonal hydraulic daily loads

2.2 Attributes

- Village layout appropriate for new sewer installation
- Adequate land area available for treatment plant facilities and land application system (LAS) options

3 Design wastewater load

On the 23 Jan 17 ecoEng visited Selwyn Huts and counted 89 existing connections. The design wastewater load is based on:

- New 150mm sewers with new house connecting drains. Zero inflow and infiltration
- 100 connections at 600L/day per connection **= 60m^3/day (maximum design daily hydraulic load)**

4 New sewers and house connections

- All existing sewers are to be disconnected and replaced with new 150mm PVC sewers
- All house connections to the new 150mm sewer are to be new and water tight
- Six (relative shallow) pump stations are to be installed. Tentative locations are illustrated in **Figures A1** and **A2, Appendix A.**

Table 1 tabulates the number of dwelling connections for each sewer lateral

Table 1. Sewer connections and lengths

Lateral #	Number of connections	Length (m)
1	21	151
2	18	145
3	10	116
4	17	150
5	12	152
6	11	151
TOTAL	89	865

5 Treatment

The preferred treatment plant is a passive aerobic process using a filtering media known as xylit. The units are provided by Eloy Water NZ, imported from the parent company in Belgium and are known as X-Perco filters. The units are fully warranted and come with European certification. A company technical sheet accompanies this report.

This treatment process was chosen because of its resilience to variable and seasonal hydraulic loads and very low power demand (pump out pumps only). Flow through the treatment plants is by gravity. There are no aerators.

6 Land application system options (LAS)

Community expectations and compliance requirements, influenced by the above constraints and other local issues, mean that there is some uncertainty with respect to details of consent conditions that may be required by Canterbury Regional Council. For these reasons three LAS options are presented. These are:

Option 1. Two 60m ecoTrenches and 4800m^2 of raised drip irrigation field. Refer to **Figures A1 and A2, Appendix A**.

Option 2. One 320m ecoTrench. Refer to **Figure A3, Appendix A**.

Option 3. 20,000m^2 raised drip irrigation field. Refer to **Figure A4, Appendix A**. Note; LASE refers to the LAS envelope, the area within which the LAS can be located.

The ecoTrench is designed to optimise the water balance (maximising base soakage, base storage, evapotranspiration and rainfall shedding) in favour of on-site wastewater assimilation. The provision of an under-drain to a storage tank with a level alarm ensures no surface ponding when the hydraulic load exceeds the capacity of the ecoTrench. For a typical cross-section and photo of the ecoTrench refer to **Figures A5 and A6, Appendix A**.

Table 2. Brief assessment of the options

Option	Comments
1	This option provides some flexibility with managing the effluent land application in accordance with site constraints as they may vary throughout the year.
2	This is the most expensive LAS option, with the lowest footprint.
3	This is the cheapest option, with the largest footprint. The adoption of cut and carry provides greater uptake of nutrients such nitrogen should this be a consent requirement.

7 Cost Estimate

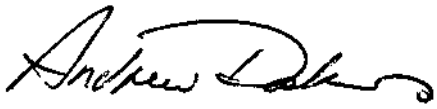
The following cost estimates, **Table 2**, have been provided by All About Sewage (AAs) Ltd. For additional details refer to the All About Sewage document accompanying this report.

Table 3. Summary of costs estimates (GST excl)

Option 1	**Cost (GST Excl)**
Sewer and pump stations	$806,200
Secondary treatment	$550,200
Land application system	435,200
TOTAL Option 1	**$1,791,600**
Option 2	**Cost (GST Excl)**
Sewer and pump stations	$806,200
Secondary treatment	$550,200
Land application system	906,500
TOTAL Option 2	**$2,262,900**
Option 3	**Cost (GST Excl)**
Sewer and pump stations	$806,200
Secondary treatment	$550,200
Land application system	380,600
TOTAL Option 3	**$1,737,000**

Costs not included:

- Engineering and compliance fees (building consents, inspections and resource consents)
- Removal of excess soil
- Electrical to mains power
- Groundwater dewatering
- Risers if required



Andrew Dakers

8 Appendix A

Figure A1. Option 1 system layout: North

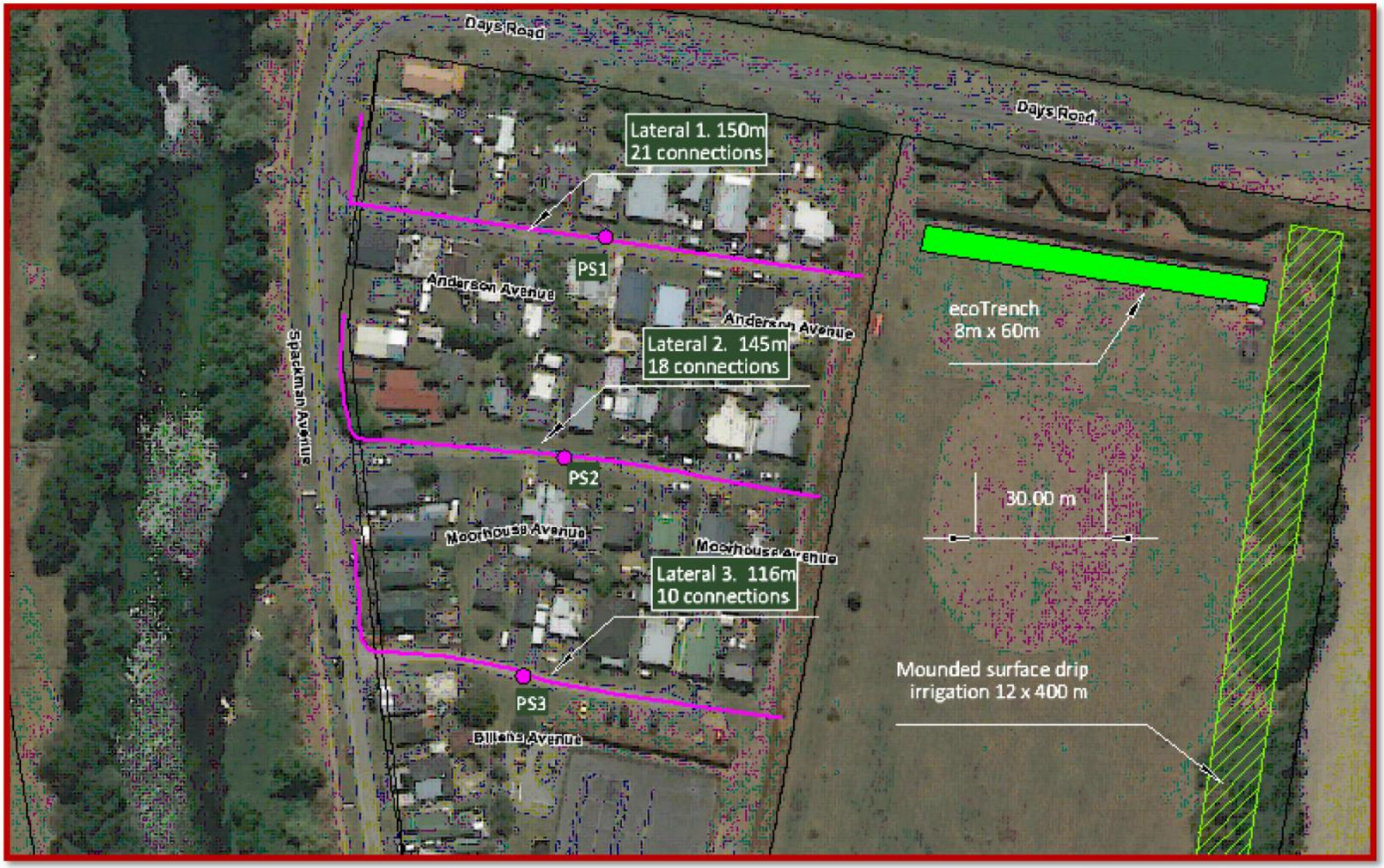


Figure A2. Option 1 system layout: South

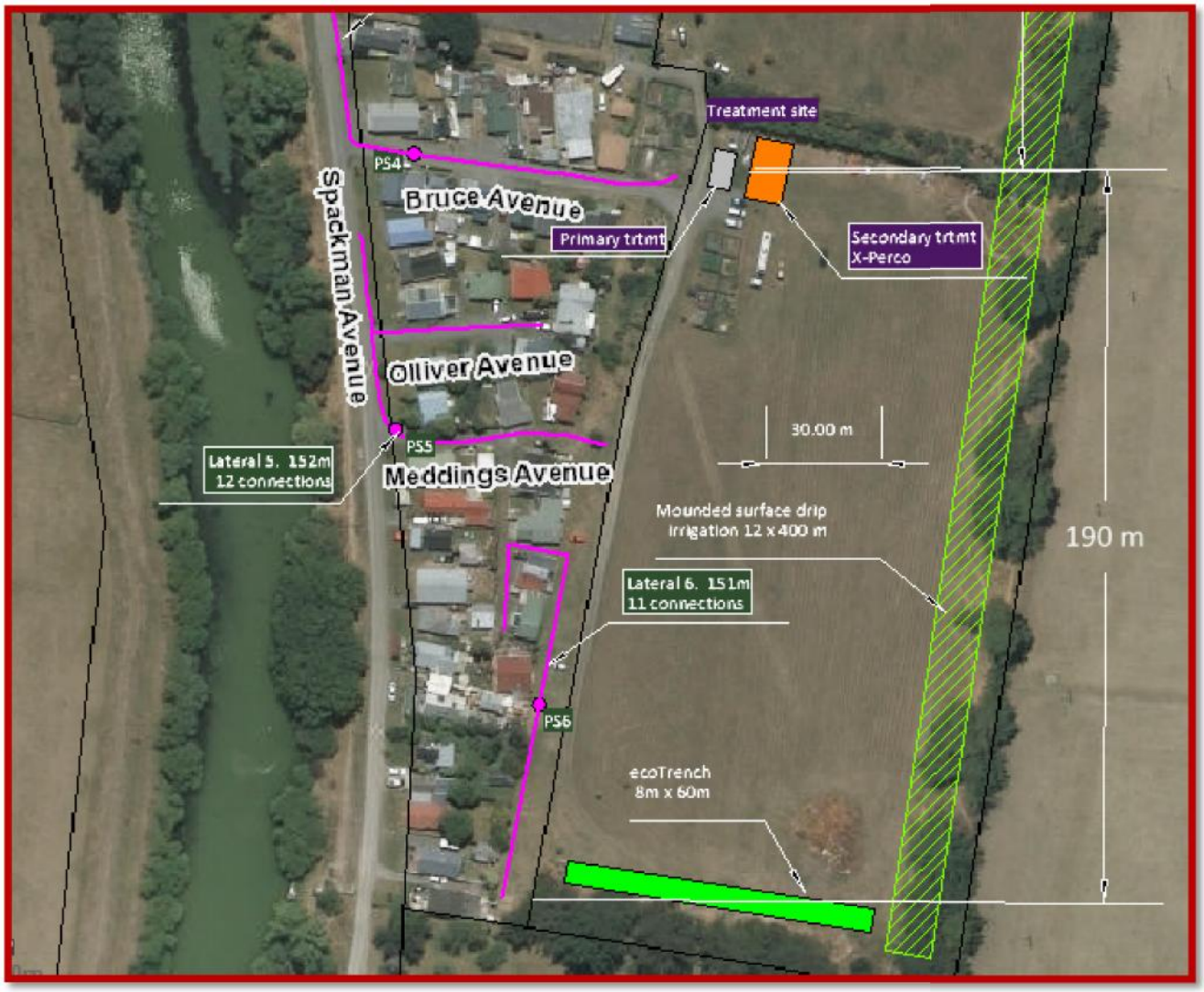


Figure A3. Option 2. 320m ecoTrench only

Figure A4. Option 2. 20, 000m^2 raised irrigation field

Figure A5. Typical ecoTrench cross-section

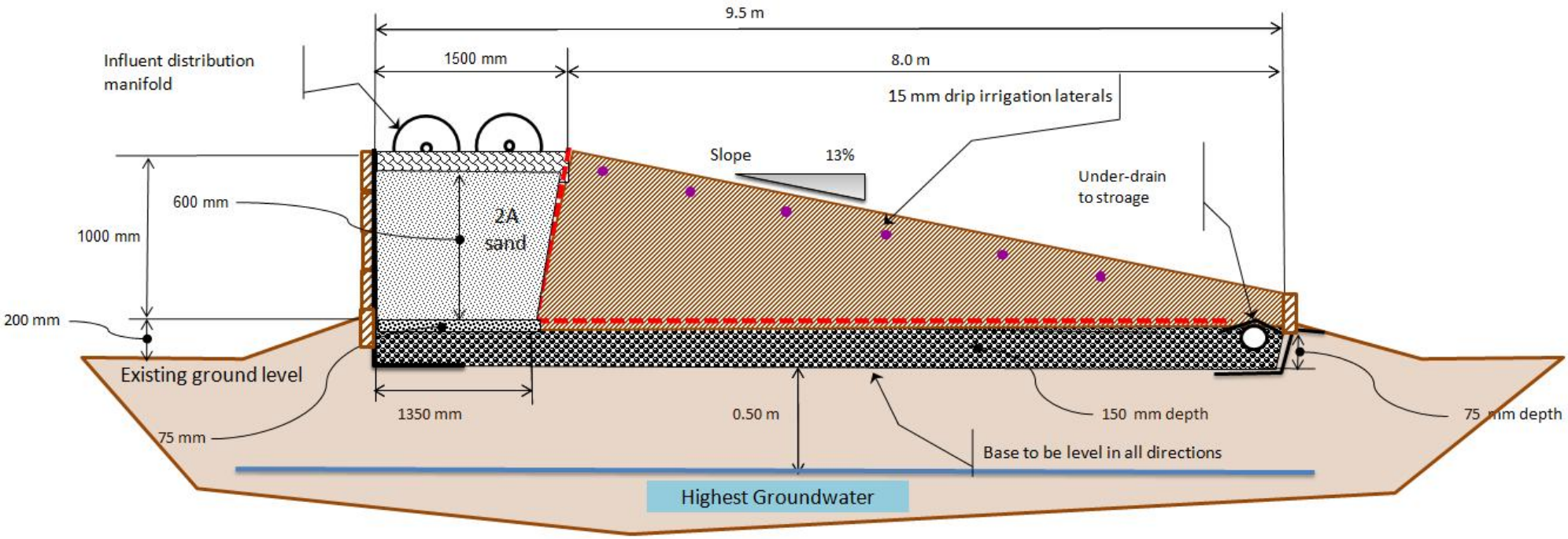


Figure A6. Example of an established ecoTrench (Akaroa)

10 YEARS GUARANTEE

X-PERCO® C-90, BUILD TO LAST

X-Perco®, naturally.

eloy water

THE TRICKLING FILTER BUILD TO LAST

"Robustness and performance" are the watchwords Eloy Water chose to offer private individuals and small communities (up to 20 inhabitant equivalents) an innovative trickling filter designed to last ! A real innovation, X-Perco® C-90 is characterised by its three great strengths :

- A robust tank with a 15-year guarantee[1] that permits the passage of light vehicles
- A **revolutionary filtering media**, Xylit is synonymous with performance and durability.
- The certainty of optimal functioning at all times. **The patented innovative system for distributing effluent** on the filtering media is used to check and adjust the level in a simple manner.

X-Perco® C-90 can be installed for permanent or intermittent use.

EXCEPTIONAL PERFORMANCES !

BOD_5	COD	SS	NH_4-N	P(tot)
< 15 mg O2/litre	< 50 mg O2/litre	< 10 mg O2/litre	< 2 mg O2/litre	< 11 mg O2/litre

Sources : CE certifications (EN-12566-3) carried out on the PIA – Aachen (NB1739) platform
Average input concentration: BOD5 388mg O2/litre; COD 759mg O2/litre ; SS 387mg/litre ; NH4-N 39,2mg/litre

CERTIFICATIONS

BELGIAN ENERGY AND ENVIRONMENT PRIZE

ENVIRONMENT & ENERGY AWARDS

FRENCH APPROVAL X-PERCO® C-90 APPROVED 2013-12

CE

HOW DOES THE X-PERCO® C-90 WORK?

The X-Perco® C-90 works without energy and produces no waste[2].
The 5 PE single tank version is organised in two compartments: a septic tank and a trickling filter.

SEPTIC TANK

In its 5 PE version, the primary decanter of the X-Perco C-90 has a volume of 3 m^3 that allows an estimated draining frequency of at least 24 months.[3]

1. Wastewater arrives at the X-Perco® C-90 station by gravity. The suspended matter will settle in the lower part of the compartment to be "degraded" by the anaerobic bacteria, while the fats and the cellulose form a "crust" on the surface.
2. The X-Perco® C-90 is equipped with a plunging, ventilated T pipe which leads the influents directly to the heart of the first compartment.
3. The outlet of the septic tank is fitted with a pre-filter. Protected from the supernatants, it prevents suspended matter from passing to the treatment area.

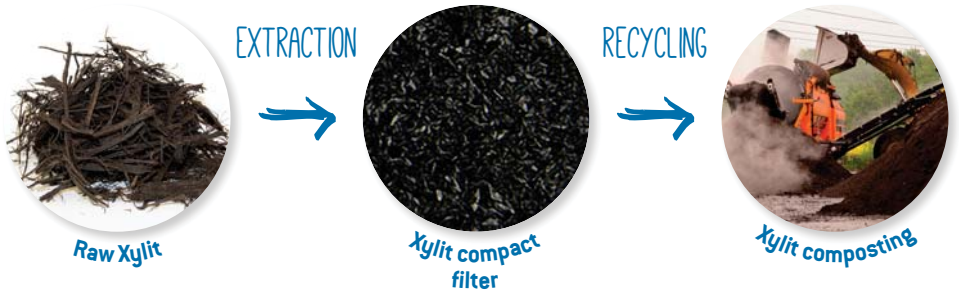
1. See the guarantee certificate for the requirements of granting and extending guarantees.
2. Apart from the organic sludge generated by any biological purification treatment.
3. Draining frequency estimated by Eloy Water.

A 100% ECOLOGICAL AND SUSTAINABLE MEDIA

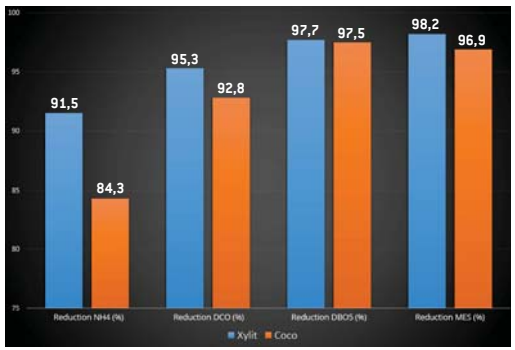
ARE YOU FAMILIAR WITH XYLIT ?

Millions of years old and composed of natural wood fibres, Xylit is derived from lignite extracted from the ground in Germany. This filtering media boasts many properties :

- High mechanical resistance that guarantees excellent stability in time ;
- Large specific surface that fosters the development of a dense bacterial biofilm far more rapidly than with any other filtering media ;
- Low ecological impact on the carbon footprint because of its proximity of our factory;
- Compostable ;
- Long service life (at least 12 years).



EXCEPTIONAL PERFORMANCES



Rigorous tests carried out by our R&D team have shown that this filtering medium is the most efficient and most ecological on the market.

Results of our "Xylit – Coconut" comparison tests

Tests carried out according to the CE certification protocol (EN 12566-3) under identical conditions (tanks and components); only the substrates are different (xylit and coconut).

BEST GUARANTEES ON THE MARKET !

Reliable products and **best guarantees on the market**. Our major concern is peace of mind for our users. We offer :

- 10-year guarantee[1 2] on the C-90 concrete tank
- 10-year guarantee[1 3] on the internal components (Xylit filtering media, distribution and apportionment device)

REGISTERED YOUR X-PERCO, EXTENDED GUARANTEES*

Register your X-Perco® C-90 on www.eloywater.com within six months of commissioning and receive, **free of charge** :

+ 5 years' guarantee[2] on the tank

+ 2 years' guarantee[3] on the internal components

[1] *See the guarantee certificate for the requirements of granting and extending guarantees.*
[2] *Valid up to 20PE. Subject to compliance with the installation, treatment application, appropriate water volume and pollution load.*
[3] *Valid up to 20PE. Subject to compliance with the installation excavation and subsequent treatment application. Excluding part subject wear and tear.*

FILTER

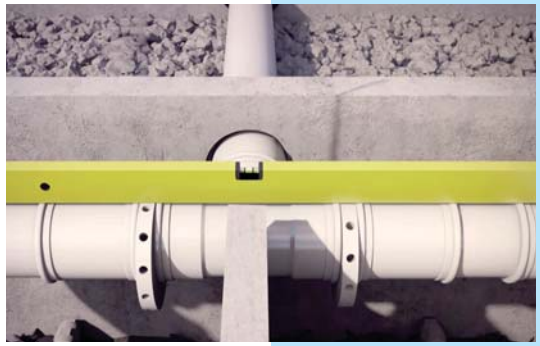
4. "Pre-treated" water arrives by gravity at the distribution device supplied by a tipping trough. The latter is filled and tips as soon as the centre of gravity is reached to disperse it on the Xylit via a distribution network consisting of pierced pipes. An integrated spirit level ensures that the distribution system functions properly and the water flow can be adjusted easily by fine tuning.
5. The "pre-treated" water flows through the Xylit, where the population of the purifying bacteria has developed and settled.
6. The oxygen needed for a proper purifying efficiency is supplied by a network of pipes of at least 100 mm in diameter.
7. The treated water leaves the filter by gravity and heads to the receiving media.
8. If the outlet drain gets clogged, the water level rises and comes into contact with the level detector placed in the ventilation pipe. The recipient, which may be placed inside or outside the dwelling, which then emits a light signal.

PATENT TAKEN OUT · DISTRIBUTION AND APPORTIONMENT DEVICE

UNIQUE DISTRIBUTION AND APPORTIONMENT DEVICE

Unique of their kind in the world, the flow distribution system (aka the Spider) and the split flow system guarante an optimal distribution of effluent on the filter. The water flow can be adjusted rapidly and easily, even if the tank is moved because of ground movement.

SPLIT FLOW DEVICE



For 10 to 20 PE devices, the compact X-Perco® C-90 are equipped with the new, unique Eloy Water apportionment system to ensure a fair apportionment of water in the different filters.

This device is accessible directly by the manhole of the X-Perco® C-90. It is composed of a T and two regulating crowns that can be adjusted by a simple rod inserted in one of the holes. A bubble level can be easily placed on the T and ensures quick control and precise adjustment of the device.

THE SPIDER

The flow distribution system, which is also equipped with a bubble level, is composed of a tipping trough placed on a receiving cupola on which the pierced pipes are fixed. The level of the cupola and the pierced pipes can be adapted very simply, with precision, thanks to 3 adjusting screws that guarantee an even apportionment of water.

AN ULTRA RESISTANT TANK

The X-Perco® C-90 tank is made of reinforced fiber self-compacting concrete. The Eloy Water revolutionary concrete guarantees resistance, long service life, and lightness. Practical for the installer and efficient for the user, the X-Perco® C-90 tank is easy to handle and install, even in the presence of groundwater, thanks to its qualities. Its highly robust nature allows for the passage of light vehicles as well.

- ✓ **Ultra resistant**
  Reinforced fibre concrete
- ✓ **Light vehicle traffic up to 3.5 T allowed**
- ✓ **Discrete**
  Full underground installation
- ✓ **Groundwater installation possible**
  Up to 80 cm of ground above the tank*
- ✓ **Easy access to internal components**
- ✓ **Difference betwen the inlet and outlet : 116 cm**

THE C90 RANGE IN CONCRETE

The X-Perco® C-90 range is available from 5 to 20 PE : 5PE, 6-7PE, 7PE, 10PE, 12PE, 14PE, 18PE and 20PE

QT TANK IN ROTO-MOULDED POLYETHYLENE

For sites where concrete cannot be used, the X-Perco® (in 5PE version) is also available in polyethylene, which is lighter to handle during the installation.

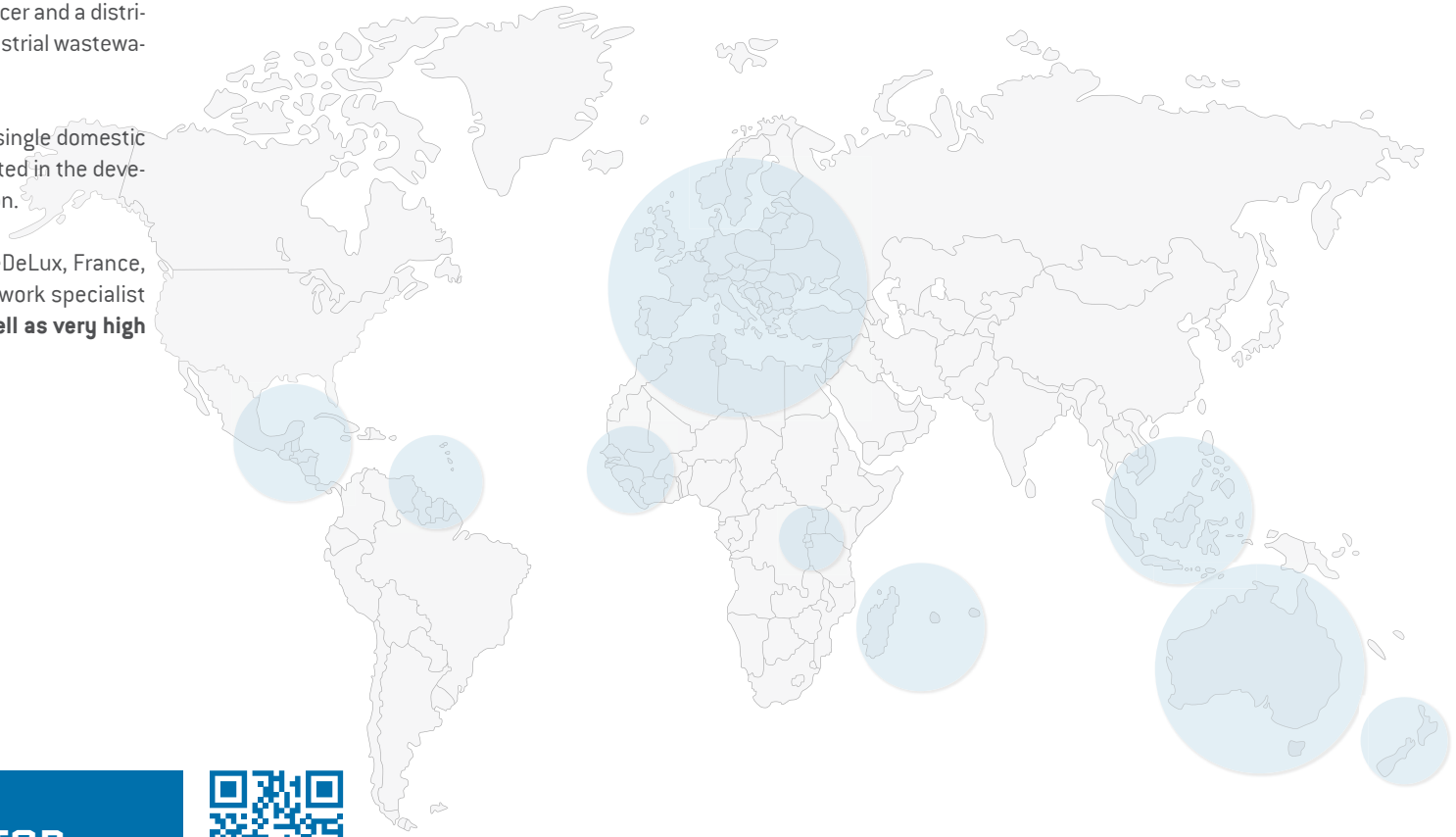
** A ballast slab is required for every backfill of more than 80 cm. Please consult us for more information.*
*** Average price of annual maintenance contract for France. Please contact your certified operator for information.*

ELOY WATER NETWORK

Eloy Water is a Belgian Company which has been a designer, a producer and a distributor of purification systems for the treatment of domestic and industrial wastewater **since 1965.**

Specialized in the treatment and the reuse of wastewater from the single domestic dwelling to medium size communities, Eloy Water has always invested in the development and integration of **the latest technologies** into its production.

With a presence in 25 countries through its six subsidiaries (BeNeDeLux, France, Australia, New Zealand, New Caledonia and Caribbean) and its network specialist distributors, **Eloy Water offers its customers a local service as well as very high availability**.



CONTACT YOUR DISTRIBUTOR

ELOY WATER
Zoning de Damré - Rue des Spinettes, 7 - 4140 Sprimont
Tel. : 04 382 44 00 - Fax : 04 382 44 01
info@eloywater.com - www.eloywater.com

Stantec

Upper Selwyn Huts Wastewater Assessment

This report has been prepared for the benefit of Selwyn District Council. No liability is accepted by this company or any employee or sub-consultant of this company with respect to its use by any other person.

Rev. No.	Date	Description	Prepared By	Checked By	Reviewed By	Approved By
1	27/5/19	Draft for Comment	SB	CM	CM	SB
2	21/6/19	Draft for Comment	SB	MR	MR	SB

1 Introduction

The following table has been compiled to provide a summary of wastewater servicing options for the Upper Selwyn Huts settlement. The purpose of this table is to assess the benefits and limitations of options considered for the conveyance, treatment and disposal of wastewater as it apply to the configuration of the community.

In addition, high level cost estimates have been provided to assist in comparing the various solution sets (combinations of viable options).

1.1 Background

The Upper Selwyn Huts wastewater scheme was initially installed in the 1920s with a septic tank and overflow discharge to the Selwyn River. The system was upgraded in 1988 by adding a pumping chamber to the septic tank, which discharges to an oxidation pond located south east of the township. A border dyke irrigation system was added, which discharges to 0.88 hectares of grassed land.

The principal issue identified is the ability of the existing or new scheme to manage, treat and dispose of the volume of wastewater generated by the community. Any option selected for needs to either accommodate or reduce the peak volumes. A comment will be made against each Conveyance option in the summary table as to whether it might reduce peak volumes. The treatment and disposal options would then be developed and designed on improvements obtained within the Conveyance network.

1.2 References

- "Upper Selwyn Huts Sewerage", MWH/Stantec, 14 January 2016
- SDC / Stantec Workshop Notes, 20 May 2019

Key for Capex / Opex: (relative to other options) Low Medium High

	Ref	Description	Benefits	Limitations	Capex	Opex	Viable
Engagement and Investigation	**EI1**	**Scheme Assessment:** Prior to design, establish tools for understanding flow rates. Water meters by property to understand site usage and I/I rates.	• *Reduced Volume: No benefit* • Once installed, can be used to assess site specific designs and for cost sharing (if required) for households	• As stated, no direct impact on reduction of flows		Monitoring meters	
	EI2	**Education:** Community specific education on the configuration of the scheme and measures required to reduce wastewater flows (i.e. water saving devices, leaks, on site treatment services etc)	• *Reduced Volume: Possible improvement* • Engagement with the community and involvement to achieve common goal • No Surprises approach in solutions and can smooth he path in the selection of Conveyance, Treatment and Disposal options	• Difficult to manage process and to measure impact of the programme • Need to be ongoing as residents could fall back to previous poor habits	No Capex	No Opex	
Conveyance	**C1**	**Status Quo**: aging infrastructure and high levels of Inflow and infiltration (I/I). gravity reticulation to terminal pump station in original community septic tank. Increasing permanent occupation of properties reflected in an increase in ADWF volumes.	• *Reduced Volume: No benefit* • No Capital cost commitments • Low interaction required with property owners	• Does not address concerns • Increasing risk of excursion events / surcharging and blockages in the network • Existing pipeline capacity limited • Increasing risk of environmental impacts with discharges via leaking pipelines • Status Quo for volume of flows may not be accepted by Ecan at time for Resource Consent renewal (Land Disposal)	No Capex	While pumping costs minimal, reactive maintenance potentially high	
	C2	**Inflow reduction**: as per **C1**, but with Inflow reduction programme to remove direct SW connections and remove overland flows (gully trap heights). Site specific inspections of laterals. SW upgrades within the community to take diverted flows, which may require a SW peak flow PS with discharge to river.	• *Reduced Volume: Direct improvements – Peak Flows / Daily Volumes* • Targeted approach with site specific solutions to reduce peak volumes. • Site specific solutions • Meet objectives from ECan to, in part, address incoming flows under the Land Disposal consent	• The percentage of flow/volume reduction is not easy to assess • Although likely reduction, the scale/amount is not guaranteed and does not address condition of existing pipelines • Labor intensive investigations and coordination with landowners • Allocation of costs as the ownership of issue (illegal SW connections) may rest with property owners • Stormwater discharge consent may be required for alterations to the existing scheme	Depending on scale of SW upgrades required	No Opex (unless SW Peak Flow PS required) Potential nett saving if volumes are reduced	
	C3	**Infiltration reduction**: as per **C1**, but with targeted infiltration reduction, requires specific CCTV inspections of laterals, pipelines and manholes. Either spot repairs or lining of existing pipelines.	• *Reduced Volume: Direct improvements – Daily Volumes* • Limits capital expenditure to areas of concern • Targeted repairs to address known problems • Minimises open excavations	• Assets need to be structurally sound, and have the required capacity • Lining QA needs to be managed • Difficult to line smaller diameter pipelines (laterals) • Limited design life for lining options (15-20 years)		No Opex	
	C4	**Greywater / Reuse**: as per **C1**, with modification of the plumbing at each property for reuse of greywater.	• *Reduced Volume: Direct improvements – Daily Volumes* • Environmental benefits with reuse of water resources (lower impacted on total water cycle) • Reduced potable water supply requirements	• Cost of retrofitting properties • Public perception of water reuse may be poor • Potential stagnating water where properties not constantly occupied (health risk)		No Opex	
	C5	**Stormwater Network Enhancement**: as per **C2**, with using the SW peak flow PS and infiltration gallery to lower the GWL within the community to reduce infiltration.	• *Reduced Volume: Possible improvement* • Integration of SW solution with reduction with WW baseflows (infiltration) • Potential retention of existing WW infrastructure • Can be managed to only activate when GWL exceed trigger levels	• Uncertainty on the flow rate required to maintain reduced level • Large infiltration gallery and/or multiple SW PS's required • Risk of subsidence beneath structures with lowered GWL		Assumes constant pumping	
	C6	**Consolidated Community Facilities**: Abandon existing collection scheme and provide one or two ablution/kitchen blocks	• *Reduced Volume: Direct improvements – Daily Volumes* • All services consolidated to set points in the community • Abandonment of aging infrastructure • Potable water, wastewater at/to limited locations • Control of water saving devices	• Likely to be unacceptable to community as would remove water supply services for each property. Otherwise a duplicate network would be required. • Additionally, H&S concerns for property owners accessing facilities in poor weather or at night • Consolidated Community Facility would need to have fully fitted ablutions, kitchens and laundries and be managed under a maintenance contract.			
	C7	**Network Renewal - Gravity**: Lateral and pipeline renewal generally on existing alignments, to a single PS.	• *Reduced Volume: Direct improvements – Daily Volumes* • Approach addresses illegal connections (lateral replacement) and infiltration within network (pipeline renewal). • Simple scheme with low operating costs • Potential to reuse existing assets where compatible with revised design • Design Life – 80-100 years	• High capital cost associated with installation at or below the GWL (dewatering) • Potentially large construction footprint depending on depth to invert required (reinstatement extents / disturbance of community during construction)	+		
	C8	**Network Renewal – LPSS by lot**: Lateral renewal and Low Pressure Sewer System (LPSS) with a unit per property. Pumping to a common discharge main.	• *Reduced Volume: Direct improvements – Daily Volumes* • Approach addresses illegal connections (lateral replacement), infiltration within network (pipeline renewal) and abandons existing terminal PS. • Pipelines/Pressure Mains laid shallow • Can reuse existing RM If connected to Oxidation Pond • Design Life – 80-100 years (civil) 25-30 years (mechanical)	• Each property may not have footprint required for an individual unit • Power supply agreement required with each property owner or local network installed. • Risk of odour / septicity where properties are not permanently occupied (minimum daily flows)			

	C9	**Network Renewal – LPSS by cluster**: Lateral renewal and LPSS with a unit per collection or cluster of properties. Pumping to a common discharge main.	• *Reduced Volume: Direct improvements – Daily Volumes* • Approach addresses illegal connections (lateral replacement), infiltration within network (pipeline renewal) and abandons existing terminal PS. • Pipelines/Pressure Mains laid shallow • Can reuse existing RM If connected to Oxidation Pond • Lower capital and opex costs than **C8** with consolidated infrastructure • Design Life – 80-100 years (civil) 25-30 years (mechanical)	• The footprint/position of each unit will need to account for the lateral connections from assigned properties (possible rider mains) • Power supply agreement required with each property owner or local network installed. • Ownership and maintenance requirements need to be defined and agreed • Risk of odour / septicity where properties connected are not permanently occupied (minimum daily flows)	💰💰💰	💰💰	🟢
	C10	**Collection Chambers**: as per **C9**, but as a storage chamber only for collection by sucker truck or similar. (refer to **TD8** and **TD9** for combined option)	• *Reduced Volume: Direct improvements – Daily Volumes* • Approach addresses illegal connections (lateral replacement), infiltration within network (pipeline renewal) and abandons existing terminal PS. • Pipelines laid shallow • No rising mains or mechanical / electrical plant required • Lower capital and opex costs than **C8** with consolidated infrastructure • Design Life – 80-100 years (civil)	• The footprint/position of each chamber will need to account for the lateral connections from assigned properties (possible rider mains) and ability to access for clean out • Power supply agreement required with each property owner or local network installed if controls incorporated • Higher risk of odour / septicity where properties are not permanently occupied (minimum daily flows)	💰💰	💰 Excludes cartage covered in **TD8 / TD9**	🟢
	C11	**Septic Tank Effluent Pumping Systems (STEPS)**: as per **C9** with a unit per collection or cluster of properties, but with pre-treatment or full treatment at each unit/site and pumping to discharge.	• *Reduced Volume: Direct improvements – Daily Volumes* • Approach addresses illegal connections (lateral replacement), infiltration within network (pipeline renewal) and abandons existing terminal PS. • Pipelines/Pressure Mains laid shallow • Can reuse existing RM If connected to Oxidation Pond • Designed to improve current treatment standards • Design Life – 80-100 years (civil) 25-30 years (mechanical)	• The footprint/position of each chamber will need to account for the lateral connections from assigned properties (possible rider mains) and ability to access for maintenance • Power supply agreement required with each property owner or local network installed • Multiple treatment sites for monitoring and management / maintenance	💰💰💰	💰💰	🟢
Treatment and Disposal	**TD1**	**Status Quo:** High levels of Inflow and infiltration. Comprises an oxidation pond located south east of the township which receives flow via a pumped flow from the existing PS. Discharge via a border dyke irrigation system. Extraordinary volumes carted away.	• No Capital cost commitments	• Discharge limited to 650 m³ per month, compromised by the amount of incoming flows. Renewal of current Resource Consent is therefore at risk • Requires cartage of excess flows that cannot be discharged to border dyke system under the consent. • Risk that current treatment provided may not be acceptable for nutrient removal for new consent(s) • Risk of increasing GWL which may compromise ability for infiltration via border dyke disposal system	No Capex	💰💰💰 Extra over cartage costs due to increased volumes	🟢
	TD2	**Increased Storage:** as per **TD1**, with increased storage constructed at the oxidation pond to accommodate peak volumes.	• Existing system, complies with nutrient removal requirements under current Resource Consent • Does not rely on flow reductions being achieved within the network • Reuses existing infrastructure and available footprint with the WWTP site • Partial cartage remains part of option during extreme events.	• Does not alter the treatment process. Risk that current treatment provided may not be acceptable for nutrient removal for new consent(s) • May still require cartage of excess flows that cannot be discharged to border dyke system under the consent. • Application to modify existing consent conditions required for the increase in treatment capacity	💰💰	💰💰	🟢
	TD3	**Increased Disposal:** as per **TD1**, with increased disposal area for treated effluent flows (i.e. larger border dyke area)	• Existing system; complies with nutrient removal requirements under current Resource Consent • Does not rely on flow reductions being achieved within the network • Partial cartage remains part of option during extreme events.	• Design investigations and assessment required and new Resource Consent applied for. • Depending on design, additional land purchase may be required • Risk of increasing GWL which may compromise ability for infiltration via border dyke disposal system	💰💰💰 Land purchase requirements	💰	🟡
	TD4	**Rapid Infiltration Basin:** as per **TD1**, with addition of a rapid infiltration basin for peak volumes.	• Existing system; complies with nutrient removal requirements under current Resource Consent. Rapid infiltration basin only used under peak events. • Does not rely on flow reductions being achieved within the network • Partial cartage remains part of option during extreme events.	• Design investigations and assessment required and new Resource Consent applied for. • Given current knowledge of the ground conditions at this site, a large footprint would be required to make this option viable. This would be subject to the design parameters to be met • Risk of increasing GWL which may compromise ability for infiltration via proposed disposal system	💰💰💰 Land purchase requirements	💰	🟡
	TD5	**Package Plant – Existing Disposal:** Replace existing terminal PS with package treatment plant, pumping treated effluent to existing oxidation pond as flow buffer and border dyke system for disposal.	• New treatment system that can be specified to meet the current or revised Resource Consent conditions • Smaller footprint than current oxidation pond • Existing infrastructure can be repurposed to integrate with the package plant (power to site, existing treatment facility) including for buffering treated effluent prior to discharge • Could be pre or post the current oxidation pond	• Network flow reductions required to mitigate risk of peak flows on Package Plant • Increased O&M requirements compared to Oxidation Pond treatment • Risk of increasing GWL which may compromise ability for infiltration via border dyke disposal system	💰💰💰	💰💰	🟢

	TD6	**Package Plant – New Disposal:** Replace existing terminal PS with package treatment plant, pumping treated effluent to land based disposal via sub surface irrigation or earthen mound at the Upper Selwyn Huts domain or elsewhere as appropriate.	• New treatment system that can be specified to meet the current or revised Resource Consent conditions • Smaller footprint than current oxidation pond • Existing infrastructure can be repurposed to integrate with the package plant (power to site) • Mitigates risk of increasing GWL at existing disposal system site	• Network flow reductions required to mitigate risk of peak flows on Package Plant and Disposal field • No flow buffering • Increased O&M requirements compared to Oxidation Pond	+++	++	
	TD7	**Raised Disposal beds:** Aligned to **C11**, where there is in-network treatment, treated effluent to land based disposal via sub surface irrigation or earthen mound at the Upper Selwyn Huts domain or elsewhere as appropriate.	• Mitigates risk of increasing GWL at existing disposal system site	• Design investigations and assessment required and new Resource Consent applied for. • Depending on design, land purchase may be required to find land that is less influenced by increasing GWLs • Performance relies on the treated effluent quality from the in-network treatment devices • Network flow reductions required to mitigate risk of peak flows on the disposal field	++	+	
	TD8	**ESSS – Cartage:** Aligned to **C10**, tanker collection and discharge to the ESSS at Pines WWTP (assuming septage receival facility has been constructed)	• Eliminates treatment and disposal locally • Minimises installed infrastructure • Resource Consent for Disposal not required as accommodated within existing ESSS	• High operator input (network monitoring, cartage) • H&S risk with multiple truck movements per week through the community • Network flow reductions required to minimise operating costs (m^3 per day to be carted) • Capital Contribution required for connection to the ESSS	+	+++ Assumes full cartage	
	TD9	**Ellesmere – Cartage:** Aligned to **C10**, tanker collection and discharge to the WWTP at Leeston WWTP	• Eliminates treatment and disposal locally • Minimises installed infrastructure • Resource Consent for Disposal not required as accommodated within existing Ellesmere Sewerage Scheme	• High operator input (network monitoring, cartage) • H&S risk with multiple truck movements per week through the community • Network flow reductions required to minimise operating costs (m^3 per day to be carted) • Capital Contribution required for connection to the Ellesmere Sewerage Scheme	+	+++ Assumes full cartage	
	TD10	**ESSS – Pumping:** terminal PS or booster PS and RM to discharge at the Allendale Lane PS in Lincoln.	• Eliminates treatment and disposal locally • Resource Consent for Disposal not required as accommodated within existing ESSS	• High CAPEX and OPEX • Network flow reductions required to minimise operating costs (m^3 per day to be carted) • Capital Contribution required for connection to the ESSS	+++	++	

2 Cost Assessment Tables

The options defined in the Summary Table can be collated into Conveyance, Treatment and Disposal Solution Sets for comparison of pricing. In each instance it is assumed that **EI1 – Scheme Assessment** and **EI2 – Education** will have been carried out. The age and condition of the existing Conveyance system suggests that renewal or replacement of all or a portion of the scheme will be required to extend its useful life.

We have also assumed the following in the compilation of these estimates:

- The estimates provided for Opex against each of the elements in the tables below are reported as Net Present Value (NPV) figures using a discount rate of 6%.
- Any Package Treatment plant will have operational visits twice per week.
- An allowance is included for regular desludging of Package Treatment Plants and STEPS systems
- For STEPS or LPSS units, the pumps will be replaced in year 20
- For Package Treatment plants, the mechanical and electrical components will be replaced in year 20
- A contingency allowance of 30% has been included.

2.1 Solution Set 1 – Do Minimum (within collection system)

- Manage / operate within the constraints of the existing collection system. Manage peak flows / inflows under normal maintenance regimes.
- A new package treatment plant with disposal to existing border dyke disposal system. Plant installed pre or post oxidation pond and capable of handling peak flows

Ref	Description	Capex	Opex
C1	Status Quo	-	-
TD5	Package Plant – Existing Disposal: Peak Flow Treatment	$1,256,000	$99,000 annually NPV $1,019,000 over 15 years NPV $1,617,000 over 30 years
	Total	$2,275,000 with 15 years OPEX $2,873,000 with 30 years OPEX	

2.2 Solution Set 2 – STEPS with existing Treatment and Disposal Locally

- Target reduction in peak and daily volumes through network renewal of scheme with a STEPS option (assuming a hub for 3 property connections).
- Use existing oxidation pond with disposal to existing border dyke disposal system.

Ref	Description	Capex	Opex
C11	Septic Tank Effluent Pumping Systems (STEPS)	$1,362,000	$35,000 annually NPV $361,000 over 15 years NPV $576,000 over 30 years
	Total	$1,723,000 with 15 years OPEX $1,938,000 with 30 years OPEX	

2.3 Solution Set 3 – STEPS with enhanced Treatment and Disposal Locally

- Target reduction in peak and daily volumes through network renewal of scheme with a STEPS option (assuming a hub for 3 property connections).
- A new package treatment plant with disposal to existing border dyke disposal system. Plant installed pre or post oxidation pond and capable of handling peak flows.

Ref	Description	Capex	Opex
C11	Septic Tank Effluent Pumping Systems (STEPS)	$1,362,000	$35,000 annually NPV $361,000 over 15 years NPV $576,000 over 30 years
TD5	Package Plant – Existing Disposal: Reduced Flow Treatment	$681,000	$62,000 annually NPV $639,000 over 15 years NPV $991000 over 30 years
	Total	$3,043,000 with 15 years OPEX $3,610,000 with 30 years OPEX	

2.4 Solution Set 4 – STEPS with Vaulted system and Disposal Remotely

- Target reduction in peak and daily volumes through network renewal of scheme with a STEPS option (assuming a hub for 3 property connections).
- Pumping to storage (120 m3), with Collection then Cartage to the Leeston WWTP (Ellesmere).

Ref	Description	Capex	Opex
C11	Septic Tank Effluent Pumping Systems (STEPS)	$1,362,000	$35,000 annually NPV $361,000 over 15 years NPV $576,000 over 30 years
TD9	Ellesmere – Cartage	$285,000	$469,000 annually $4,827,000 over 15 years $6,840,000 over 30 years
	Total	$6,835,000 with 15 years OPEX $9,063,000 with 30 years OPEX	

2.5 Limitations on Estimates

With regards to budget estimates provided for the costs of construction, Stantec warrants only that we have exercised the reasonable skill, care and diligence of a Consulting Engineer in the preparation of our professional opinion of those costs. Stantec has no control over costs of labour, materials, competitive bidding environments and procedures, unidentified field conditions, financial and/or market conditions, or other factors likely to affect the probable cost of the works, all of which are and will unavoidably remain in a state of change. Stantec cannot and does not make any warranty, promise, guarantee, or representation, either express or implied, that proposals, bids, project construction costs, or cost of operation or maintenance will not vary substantially from its good faith cost estimate.

Consenting will be required for all options that include new treatment processes or effluent disposal locations, any change to the existing stormwater disposal may also require consent to discharge to the river. Stormwater treatment may be required depending on the consent conditions. The costs associated with consenting are dependent on the conditions and notifications required and therefore any professional service indications are high level for comparison purposes only.

APPENDIX 7

22 July 2019

Name Click here and type the Name

Address 1 Click here and type Address 1

Address 2 Click here and type Address 2

City & Postcode CLICK HERE AND TYPE CITY AND POSTCODE

Posted 23/7/19

Dear Selwyn Hut Resident

Update on Consent Renewal Process

As you will be aware the Council is currently investigating options as to how to provide wastewater services for the Upper Huts community. Options being considered range from upgrading the current wastewater treatment plant to other options that have been identified by community members or Council staff/consultants.

Most options will require the Council to apply for a resource consent from Environment Canterbury. As with any compliance process, it is important that the Council can demonstrate that it is operating the current wastewater plant in accordance with the existing resource consent conditions.

One consent condition that is challenging to meet at times relates to the maximum volume of wastewater that can be treated. When the volume of wastewater discharged by the huts community is greater than the allowed consent condition, the Council needs to remove this additional wastewater volume by trucking the effluent away to another site for treatment processing.

In recent weeks Selwyn Huts locals approached Council contractors at the wastewater plant site questioning what they were doing. Although asking Council staff and contractors to explain what they are doing is a regular occurrence, the manner in which the local did so was deemed offensive and unacceptable to our contractors and the Council. From a Council perspective any inappropriate behaviour in such situations will not be accepted or tolerated.

The Council appreciates that there is probably a lack of understanding as to why the truck has been appearing at the ponds from time to time which is the reason for this letter. As you will now appreciate the truck is removing excess water, not adding wastewater to the pond. Some individuals may not believe these explanations, as an individual suggested that the truck in question had been down to the Lower Huts and was bringing material from the vaulted system at the Lower Huts, and dumping in the pond.

The Council is able to make statements about where the contractor's truck has been with total confidence because SICON vehicles and the trucking company removing the waste water have a tracking device on them called Eroads.

Eroads is a vehicle compliance system which, as well as tracking a vehicle, can also be used by a vehicle operator and the Government as a means by which road user licence charges are paid. Accordingly the systems authenticity as a means of tracking vehicles is acceptable to the Government and also to the Council.

Thus the Council is totally confident that both SICON and the trucking company when they say they have not been dumping effluent inappropriately at the Upper Selwyn Huts pond, and the Council can accept this explanation.

The above statements may seem rather extensive and perhaps over the top by some, but I have included them to show that the Council takes residents' concerns seriously and follows them up to find out the facts.

Council staff recently met with Environment Canterbury staff to discuss further the resource consent process. Being able to report on the above trucking actions also gives Environment Canterbury confirmation that Council and the community take consent conditions seriously.

Stormwater Discharges

Recently Council staff wrote to a number of hut owners asking them to stop discharging rain water from their hut roof into the wastewater system. Please ensure that this work is done promptly to ensure that the Council can eliminate every possible excess water from the wastewater plant. It is also a condition of your licence (Clause 13.1 [e] "ensure that storm water is not discharged from the Lot into the waste water system") that you do not undertake activities that are detrimental to the Council operating the wastewater plant.

If you have questions in relation to this letter please do not hesitate to contact me.

Yours faithfully

Douglas Marshall
GROUP MANAGER PROPERTY

APPENDIX 8

2 August 2019

Name Click here and type the Name
Address 1 Click here and type Address 1
Address 2 Click here and type Address 2
City & Postcode **CLICK HERE AND TYPE CITY AND POSTCODE**

Dear Sir/Madam

The Deed of Licence allows a licensee to rent or hire out their hut/dwelling (Clause 19.1 is noted below) **provided** written consent is given by Council.

On this basis Council put in place a process to be followed if a hut owner wished to either rent or sub-let their hut for a short term holiday rental or a longer term rental of six (6) weeks or more. It is a requirement that **ALL** hut owners who either:

- currently have people occupying their hut for whatever reason get in touch with the Council, or
- you are an absentee hut owner that would like to consider renting out or sub-letting your hut

contact the Council and obtain the necessary consent to undertake this activity. This includes those hut owners who have a previous approval.

As part of the work being done in relation to the future upgrade of the wastewater treatment plant, Council need an accurate understanding of the actual occupancy numbers of the huts at the settlement.

On this basis **all licence holders** must fill out the attached 'Declaration of Hut Use/Occupancy' form and return it to the Council in the envelope provided or alternatively scan the form and email to tanya.maylam@selwyn.govt.nz by **23 August 2019.**

Yours faithfully

Douglas Marshall
GROUP MANAGER PROPERTY

Clause 19.1 – The Licensee is not to transfer, sublicence, rent or hire out, assign, mortgage or otherwise dispose of the Licensee's interest under this Licence or any part of it without the prior written consent of the Licensor (such consent not to be unreasonably withheld). Where the Licensor's consent is given, the Licensee shall procure that the transferee enter into a new licence with the Licensor for the balance of the current Term, such new licence to otherwise be on the same terms and conditions as contained in this Licence.

UPPER SELWYN HUTS – DECLARATION OF HUT USE/OCCUPANCY

Tick the boxes below which indicate the **best use/occupancy** of your hut at the current time and the number of occupants e.g. if you occupy your hut permanently, and live with your wife/husband/partner i.e. that is 2 people live permanently at the hut, you would answer as follows:

EXAMPLE ONLY	**Tick**	**Number of Occupants**	**Average No. of days per year**
Permanent Occupancy by hut owner	√	2	365
Owner holiday accommodation only			
Not currently occupied			
Short term holiday rental accommodation (no more than a 6 week period)			
Long Term rental accommodation (rental longer than a 6 week period)			

Name:	
Hut/Lot number:	
I declare the following details below relating to hut use/occupancy are correct as at today's date:	
Signature	Date

	Tick	**Number of Occupants**	**Average No. of days per year**
Permanent Occupancy by hut owner			
Owner holiday accommodation only			
Not currently occupied			
Short term holiday rental accommodation (no more than a 6 week period)			
Long Term rental accommodation (rental longer than a 6 week period)			

DEAR SELWYN HUTS RESIDENTS

GENERAL NOTICE

Following an inspection of the playground equipment and other features on the reserve Council staff have, for health and safety reasons, had to undertake the following actions.

Rugby Goal Posts

Council contractors have removed the goal posts in the public reserve. They had become unstable and could have fallen on a person causing injury. It is not Council's intention at this time to replace the goal posts unless Council receive input and feedback indicating how often the goal posts are used. Council will then consider reinstating compliant goal posts but would encourage the community to consider other items of recreation activities that could be installed.

Basketball Hoop

The community were previously advised that due to the unsafe condition and non-compliance of the original basketball hoop (which was attached to the new tennis court fencing) the basketball hoop had to be removed. The Council removed the hoop a number of months ago.

Some members of the community took it upon themselves to reinstate the basketball stand with backboard and attach the backboard to the top of the tennis court fence. Unfortunately this is also non-compliant and will be removed shortly.

Once again, as with the goal posts, if Council receives input and feedback from the community, and there is a clear case that the basketball hoop is regularly used then Council will consider reinstating a compliant basketball hoop and associated backboard.

Any feedback on either of these facilities can be emailed to reserves@selwyn.govt.nz and headed 'Selwyn Huts Feedback'

Douglas Marshall
GROUP MANAGER PROPERTY

2 August 2019

APPENDIX 10

190808006

HERITAGE NEW ZEALAND
POUHERE TAONGA

COPY

5 August 2019

File ref: 12002-023

David Ward
Chief Executive Officer
Selwyn District Council
PO Box 90
ROLLESTON 7643

Dear David

Update on the application to enter the Upper Selwyn Huts on the New Zealand Heritage List

We're writing to update you about the application to enter Upper Selwyn Huts, Springston, on the New Zealand Heritage List/Rārangi Kōrero ('the List'). To decide whether the application has enough merit to proceed further, we've carefully considered it against the requirements of the Heritage New Zealand Pouhere Taonga Act 2014.

We want to let you know that we're declining the application. Douglas Marshall, Property and Commercial Manager at the Selwyn District Council, has highlighted that complications around expected sea level rise and issues of storm water management mean that hut licences and subsequent renewals will only be issued for a short term finite period.

We recognise that these are difficult environmental issues and are cause for concern for the community of hut owners.

However, we would require more certainty from the Council or Crown about the huts being able to remain and survive at Upper Selwyn, before we could progress any nomination for entry of the Upper Selwyn Huts on the List.

If you become aware that the circumstances of the place have changed, please let us know. We have contacted the nominator of the Upper Selwyn Huts and will also contact the Department of Conservation.

Please let the community know
Would you please arrange for Council to inform the licence holders of this decision.

Contact us for more information
If you have any questions about this letter, please do not hesitate to contact me.

Yours sincerely

Christine Whybrew
Area Manager (Canterbury/West Coast)

Attachment: Nomination record
cc. Manager Heritage Listing, Heritage New Zealand
Douglas Marshall, Property and Commercial Manager, Selwyn District Council

p (64 3) 3631880 a Southern Regional and Canterbury/West Coast Area Office a PO Box 4403, Christchurch Mail Centre 8140 w heritage.org.nz

List Entry Record

List Number: 9749 Site Reference: P179895

HERITAGE NEW ZEALAND
POUHERE TAONGA

Name: Upper Selwyn Huts

Other Names:

Name	Year From	Year To
Springston South Reserve		
Selwyn Huts		

Location: 17 Spackman Avenue, Springston 7674

List Entry Legal Description:

Local Authority: Selwyn District

Summary: The information below is from the nomination form
The Upper Selwyn Huts were established as a Public Recreation Area gazetted 17 02 1896 (1896/325). One of a very few fishing reserves designated in New Zealand. Historic and social value - for more information see nomination form.

List Entry Status: Nomination Declined

List Entry Type: Historic Place Category 2

List Number: 9749

Date Entered:

Extent of List Entry:

Chattels

District Plan Listing:

Maori Interest:

Heritage NZ Office: Canterbury/West Coast Office

Other Information:

General Nature of Wahi Tapu:

Section 66(1) & 66(3) Assessment:

Section 66(1) Detail:

Section 66(3) Detail:

Statement of Wahi Tapu: