Environment Canterbury
Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636
200 Tuam Street
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25 September 2018

Selwyn District Council
PO Box 90
Rolleston 7643

Dear Sir/Madam

Compliance Monitoring Report
Selwyn - Waihora Water Management Zone

Please find enclosed your compliance monitoring report for the following activity. It is important that you read this report carefully.

Consent number:	CRC040100.1
Location:	Burnham School Road, ROLLESTON
Description:	To discharge contaminants to air from the treatment of raw sewage and sludges.

Overall consent compliance: **Complies**

Reminder(s)

If you would like any further information regarding this report please do not hesitate to contact me.

Yours sincerely

Trinity White
Resource Management Officer II Monitoring and Compliance

Doc No: *C18C/133722*
Your Customer No: *EC118692*
File No(s): *CO6C/20630-1*

Consent No: ***CRC040100.1***

Description of consent	**Commencement Date**
To discharge contaminants to air from the treatment of raw sewage and sludges.	21 Dec 2010
Location	**Expiry Date**
Burnham School Road, ROLLESTON	15 Dec 2038

Conditions & compliance

1 The discharge shall be only odour and aerosols arising from the treatment of wastewater and associated drying of sludges, the irrigation of treated effluent and the application of Class Aa Biosolids on Lot 1 DP 309881 (Certificate of Title CB 98051), Burnham School Road, Burnham.

Compliance Report:
Complies

The discharge to air consisted only of aerosols associated with the treatment of wastewater, sludge drying and the irrigation of treated effluent.

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2 The consent holder shall carry out the discharge to air in accordance with the information supplied as part of the application titled “Resource Consent Application and Assessment of Environmental Effects for Rolleston Wastewater Project June 2003”, and the “Discharge of Odour and Contaminants to Air from the Upgraded Pines Wastewater Treatment Plant” application lodged March 2010, and the design plans submitted, except as otherwise required by conditions of this discharge permit. In the event of any conflict between the information supplied with the applications and consent condition(s), the condition(s) shall prevail.

Compliance Report:
Not monitored

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3 The wastewater treatment and sludge drying operations shall not cause any odour or dust particles that are offensive or objectionable beyond the property boundary of the consent holder.

Compliance Report:
Complies

At the time of my visit, there was no odour beyond the property boundary that would be considered offensive or objectionable.

---

4 All inlet works and screens of the treatment facility receiving wastewater of septage shall be fully enclosed and ventilated to emission control equipment as may be necessary to achieve with Condition (3).

Compliance Report:
Complies

The screen skip is fully enclosed, emissions from the skip are ventilated to the odour scrubber for biological removal.

---

5 The consent holder shall ensure that:

a. Sludges and/or bio-solids produced from the treatment facility are aerobically digested prior to air-drying.

b. Anaerobic drying of sludges and/or bio-solids does not occur at the site.

Compliance Report:
Complies

Automatic DO readings are taken from probes housed within the digester to ensure conditions are suitable for aerobic digestion. In addition to this, anual readings are taken Monday, Wednesday and Friday using a portable probe, this information is recorded on a check sheet in the office. The dairy check sheet for the day I visited showed an average DO reading of 2.02mg/l across the four cells.

---

6 Drying of bio-solids and sludges shall be restricted to air-drying processes only.

Compliance Report:
Complies

Bio-solids and sludges are air dried in a large glass house. Once dry these solids are carted to the West Coast for disposal, according to Daryl the solids were carted twice in the past year, this is likely to occur again in September/November when ground conditions in the receiving location are more conducive to spreading.

---

7 Records of complaints relating to the sewage treatment and disposal operations shall be maintained, and shall include:

a. Location where the odour was detected by the complainant;

b. Date and time when the odour was detected;

c. A description of the wind speed and wind direction when the odour was detected by the complainant;

d. The most likely cause of the odour detected; and

e. Any corrective action undertaken by the consent holder to avoid, remedy or mitigate the odour detected by the complainant.

Compliance Report:
Not operational

I was informed SDC had not received any odour complaints since their consent was last monitored.

---

8 A Management Plan shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, at least two months prior to the exercise of this consent. The Management Plan shall:

a. Set out how the activity authorised by this consent shall be operated to enable compliance with the consent conditions.

b. Be maintained at all times and any changes to the Management Plan shall be submitted to the Canterbury Regional Council prior to those changes taking effect.

Compliance Report:
Unable to determine compliance

A Management Plan for Pines II WWTP was prepared in February 2013 by MWH. A copy of this plan is held on file (C13C/43237) at Environment Canterbury. Condition 8(b) requires the Mangement Plan to be maintained at all times, if there have been changes in processes or updates to this plan since the initial plan was provided can you please provide a copy of this update.

General comments

On Monday the 15th of July a routine site visit was conducted at The Pines WWTP on Burnham School Road. The purpose of this visit was to assess compliance with the conditions of the consents associated the plant. On site I meet with David from SDC as well as Daryl Collins and Chris Salkeld of Sicon. Chris is the Treatment Plant Supervisor.

Please feel free to contact me on 027 578 0947 or trinity.white@ecan.govt.nz should you wish to discuss this compliance report further.

Date Inspected: 26 Jul 2018

Monitored By: Trinity White

Signature:

Resource Management Officer II Monitoring and Compliance

General information

Canterbury Regional Council Obligations

Under Section 35 of the Resource Management Act 1991, the Canterbury Regional Council has a duty to monitor all resource consent exercised within its region, to make sure all the conditions are being complied with.

Monitoring Frequency

The frequency with which your consent is monitored will vary according to the type of activity your consent authorises, the conditions imposed and the extent to which you have complied with these conditions on previous visits. **If you fully comply with all conditions then frequency will reduce to the minimum set for the activity.**

Costs

It is the Council's policy to recover all actual and reasonable costs of compliance monitoring of resource consents.

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12 February 2019

Selwyn District Council
PO Box 90
Rolleston 7643

Dear Sir/Madam

Compliance Monitoring Report
Selwyn - Waihora Water Management Zone

Please find enclosed your compliance monitoring report for the following activity. It is important that you read this report carefully.

Consent number:	CRC101111
Location:	Burnham School Road, Main South Road & Brookside Road, ROLLESTON
Description:	To store contaminants.

Overall consent compliance: **Complies**

Thank you for complying with the resource consent conditions that have been monitored. If you continue to fully comply with all conditions then the frequency of monitoring will reduce to the minimum set for the activity.

Reminder(s)

If you would like any further information regarding this report please do not hesitate to contact me.

Yours sincerely

Trinity White
RMO II Monitoring & Compliance

Consent No: ***CRC101111***

Description of consent	**Commencement Date**
To store contaminants.	21 Dec 2010
Location	**Expiry Date**
Burnham School Road, Main South Road & Brookside Road, ROLLESTON	17 Dec 2045

Conditions & compliance

1 The use of land shall only be for the storage of:

a. Wastewater.

b. Rainfall that has entered the storage facility.

c. Stormwater that has infiltrated the sewerage pipeline network.

d. Sludges and bio-solids arising from the treatment of wastewater.

For the purposes of this consent these shall be collectively referred to as the "contaminants".

Compliance Report:

Complies

Storage is only used for the contaminants authorised above.

2 The contaminants shall only be stored in treatment facilities and air-drying beds located on Lot 1 DP 309881, Burnham School Road, Burnham at or about NZMS 260 M36:5647-3177 as show on Plan CRC101111, which forms part of this consent.

Compliance Report:

Complies

Contmaminants are only stored within the treatment facilities and airy drying beds as shown on Plan CRC101111.

3 Design plans for the treatment facility and air-drying beds shall be submitted to the Canterbury Regional Council at least one (1) month prior to the construction of the system. A certificate by a Chartered Professional civil engineer or environmental engineer shall be provided to the Canterbury Regional Council within one (1) month of the construction of any of the treatment and air-dryings beds. This certificate shall certify that the facilities are constructed in accordance with the design plans and conditions of consent.

Compliance Report:
Complies

Design plans have been provided (C17C/24502). MHW has certified facilities have been constructed in accordance with these design plans. As this plant is going through a period of construction/expansion, please ensure plans/certification for any updated infrastructure are also provided upon completion.

---

4 The air drying beds shall have a maximum area of 2.5 hectares.

Compliance Report:
Complies

The air-drying beds currenly occupy approximately 0.25ha. There are plans to extend this area in the near future.

---

5 The treatment, storage and air-drying facilities shall not be located within 20 metres of any surface waterbody.

Compliance Report:
Not monitored

---

6 Components of the treatment and air-drying facilities shall be constructed of an impervious material and shall be maintained at all times to prevent the leakage of wastewater onto or into the land where it may enter water.

Compliance Report:
Complies

There was no evidence of cracks or leakage from these facilities at the time of my visit. The treatment and air drying facilitieis have been constructed/sealed using aan impervious material, namely concrete.

---

7 The Canterbury Regional Council may, once per year, on any of the last five (5) working days of February or August, serve notice of its intention to review the conditions of this consent for the purposes of any of the following:

a. Dealing with any adverse effect on the environment which may arise from the exercise of this consent and which it is appropriate to deal with at a later stage.

b. Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

c. Complying with the requirements of a relevant rule in an operative regional plan.

General comments

On the 30th of November 2018 I conducted a routine site visit at Selwyn District Council's WWTP 'The Pines'. On site I met with Amit Chauhan (SDC) and Chris Salkeld (Sicon).

If you wish to discuss the contents of this report or your resource consent further, please feel free to contact me on 027 578 0947 or at trinity.white@ecan.govt.nz

Date Inspected: 30 Nov 2018

Monitored By: Trinity White

Signature:

RMO II Monitoring & Compliance

General information

Canterbury Regional Council Obligations

Under Section 35 of the Resource Management Act 1991, the Canterbury Regional Council has a duty to monitor all resource consent exercised within its region, to make sure all the conditions are being complied with.

Monitoring Frequency

The frequency with which your consent is monitored will vary according to the type of activity your consent authorises, the conditions imposed and the extent to which you have complied with these conditions on previous visits. **If you fully comply with all conditions then frequency will reduce to the minimum set for the activity.**

Costs

It is the Council's policy to recover all actual and reasonable costs of compliance monitoring of resource consents.

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26 July 2018

Selwyn District Council
PO Box 90
Rolleston 7643

Dear Sir/Madam

Compliance Monitoring Report
Selwyn - Waihora Water Management Zone

Please find enclosed your compliance monitoring report for the following activity. It is important that you read this report carefully.

Consent number:	CRC101111
Location:	Burnham School Road, Main South Road & Brookside Road, ROLLESTON
Description:	To store contaminants.

Overall consent compliance: **Complies**

Thank you for complying with the resource consent conditions that have been monitored. If you continue to fully comply with all conditions then the frequency of monitoring will reduce to the minimum set for the activity.

Reminder(s)

If you would like any further information regarding this report please do not hesitate to contact me on 027 578 0947.

Yours sincerely

Trinity White
Resource Management Officer II Monitoring and Compliance

Doc No: *C18C/102896*
Your Customer No: *EC118692*
File No(s): *CO6C/20630*

Consent No: ***CRC101111***

Description of consent	**Commencement Date**
To store contaminants.	21 Dec 2010
Location	**Expiry Date**
Burnham School Road, Main South Road & Brookside Road, ROLLESTON	17 Dec 2045

Conditions & compliance

1 The use of land shall only be for the storage of:

a. Wastewater.

b. Rainfall that has entered the storage facility.

c. Stormwater that has infiltrated the sewerage pipeline network.

d. Sludges and bio-solids arising from the treatment of wastewater.

For the purposes of this consent these shall be collectively referred to as the "contaminants".

Compliance Report:

Complies

At the time of my visit storage of only the above 'contaminants' was occurring.

---

2 The contaminants shall only be stored in treatment facilities and air-drying beds located on Lot 1 DP 309881, Burnham School Road, Burnham at or about NZMS 260 M36:5647-3177 as show on Plan CRC101111, which forms part of this consent.

Compliance Report:

Complies

The contaminants were only stored within the treatment facilities and air-drying beds within the are defined on Plan CRC101111.

---

3 Design plans for the treatment facility and air-drying beds shall be submitted to the Canterbury Regional Council at least one (1) month prior to the construction of the system. A certificate by a Chartered Professional civil engineer or environmental engineer shall be provided to the Canterbury Regional Council within one (1) month of the construction of any of the treatment and air-dryings beds. This certificate shall certify that the facilities are constructed in accordance with the design plans and conditions of consent.

Compliance Report:

Complies

Environment Canterbury has received a copy of the design plans as well as a letter from the MHW engineer certifying that the facilities are constructed in accordance with the design plans (internal reference C17C/24502).

---

4 The air drying beds shall have a maximum area of 2.5 hectares.

Compliance Report:
Complies

The air-drying beds currently installed cover an area of approximately 0.25ha. It is my understanding that this area will be expanded in the near future.

---

5 The treatment, storage and air-drying facilities shall not be located within 20 metres of any surface waterbody.

Compliance Report:
Not monitored

Based on previous monitoring reports from this site, it is my understanding that a drain used to run along the south-western boundary of the site, and that this drain has been decommissioned.

---

6 Components of the treatment and air-drying facilities shall be constructed of an impervious material and shall be maintained at all times to prevent the leakage of wastewater onto or into the land where it may enter water.

Compliance Report:
Complies

All of the wastewater treatment and air-drying facilities have been constructed using impervious material such as contract. At the time of my visit, there was no signs of cracks and/or seepage from these structures.

---

7 The Canterbury Regional Council may, once per year, on any of the last five (5) working days of February or August, serve notice of its intention to review the conditions of this consent for the purposes of any of the following:

a. Dealing with any adverse effect on the environment which may arise from the exercise of this consent and which it is appropriate to deal with at a later stage.

b. Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

c. Complying with the requirements of a relevant rule in an operative regional plan.

General comments

On Monday the 15th of July a routine site visit was conducted at The Pines WWTP on Burnham School Road. The purpose of this visit was to assess compliance with the conditions of the consents associated the plant. On site I meet with David from SDC as well as Daryl Collins and Chris Salkeld of Sicon. Chris is the Treatment Plant Supervisor.

Please feel free to contact me on 027 578 0947 or trinity.white@ecan.govt.nz should you wish to discuss this compliance report further.

Date Inspected: 16 Jul 2018

Monitored By: Trinity White

Signature:

Resource Management Officer II Monitoring and Compliance

General information

Canterbury Regional Council Obligations

Under Section 35 of the Resource Management Act 1991, the Canterbury Regional Council has a duty to monitor all resource consent exercised within its region, to make sure all the conditions are being complied with.

Monitoring Frequency

The frequency with which your consent is monitored will vary according to the type of activity your consent authorises, the conditions imposed and the extent to which you have complied with these conditions on previous visits. **If you fully comply with all conditions then frequency will reduce to the minimum set for the activity.**

Costs

It is the Council's policy to recover all actual and reasonable costs of compliance monitoring of resource consents.

From:	Andy Barbati-Ross
To:	Brian Ellwood; Murray England
Cc:	Amit Chauhan; Rob Potts; Johannes Welsch; Katie Nagy; Paul Hulse
Subject:	RE: Selwyn District Council Pine Biosolids application to land
Date:	Tuesday, 12 May 2020 1:22:59 PM
Attachments:	Declined Non-enforcement decision for Pines Waste Water Treatment Plant CRC131423 - Discharge of Class Ab Biosolids.pdf image001.png image002.jpg

Hi Brian and Murray

As promised, please find attached the letter stating that the non-enforcement decision proposal has been declined.

Should you have any query, please contact me if you have nay question

Kind regards

Andy

From: Andy Barbati-Ross
Sent: Tuesday, 12 May 2020 1:12 PM
To: Brian Ellwood <x@xx
Cc: Amit Chauhan <x@xx; Rob Potts <x@xx; Murray England <x@xx
Subject: RE: Selwyn District Council Pine Biosolids application to land

Hi Brian and Murray,

Apologies for taking until now to get back to you.

Please note that the proposal has been declined.

Your proposal was reviewed by our Science Department (Soil, Hazards, Groundwater) and Zone Delivery Team (Compliance Monitoring) who indicated that:

- The data provided shows potential environmental effects (nutrient leaching, areal loading and concentrations, nutrient concentrations of biosolids, concentration of nutrient and contaminants in top 15 cm soil profile) that need to be addressed via a full assessment within the processes set out by the RMA,
- The Pines WWTP is already non-compliant with several other consents held for the site, and
- Covid-19 restrictions have now eased and would allow disposal of Class Ab biosolids.

I will send you a letter with the above decision

Kind regards

Andy

From: Andy Barbati-Ross

Sent: Wednesday, 6 May 2020 12:50 PM
To: Brian Ellwood <x@xxx>
Cc: Amit Chauhan <x@xxx>; Rob Potts <x@xxx>
Subject: RE: Selwyn District Council Pine Biosolids application to land

Hi Brian

We are still reviewing your proposal and I should be able to get back to you at the end of the week

Kind regards

Andy

From: Brian Ellwood <x@xxx>
Sent: Thursday, 30 April 2020 3:52 PM
To: Andy Barbati-Ross <x@xxx>
Cc: Amit Chauhan <x@xxx>; Rob Potts <x@xxx>
Subject: RE: Selwyn District Council Pine Biosolids application to land

Hi Andy,

Thank you for the confirmation of receiving the memo.
We look forward to hearing from you in due course.

Best regards

Brian

Brian Ellwood
Lowe Environmental Impact

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---

From: Andy Barbati-Ross <x@xxx>
Sent: Thursday, 30 April 2020 3:42 pm
To: Brian Ellwood <x@xxx>
Cc: Amit Chauhan <x@xxx>; Rob Potts <x@xxx>
Subject: RE: Selwyn District Council Pine Biosolids application to land

Hi Brian,

Thanks for your proposal.

We are in the process of reviewing your proposal and I will get back you once a decision has been made or in case we need further information.

Kind regards

Andy

From: Brian Ellwood <x@xxx>
Sent: Wednesday, 29 April 2020 3:40 PM
To: Andy Barbati-Ross <xx@xxx>
Cc: Amit Chauhan <xx@xxx>; Rob Potts <x@xxx>
Subject: Selwyn District Council Pine Biosolids application to land

Hi Andy,

Following may call early last week, please see attached letter seeking temporary non enforcement of the application of Biosolids to land that do not fully meet Aa quality standard.

We look forward to approval to proceed to apply the solids that are currently in the drying chambers. Should you have any questions please do not hesitate to contact me.

Best regards

Brian

Brian Ellwood

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| E | x@xxx **| W |** www.lei.co.nz

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PO Box 345
Christchurch 8140
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12 May 2020

Brian Ellwood
Lowe Environment Impact
PO Box 29288,
Christchurch 8440
New Zealand

Dear Brian

Non-Enforcement Decision Proposal – Pines Waste-Water Treatment Plant (CRC131423) – Discharge of Class Ab biosolids

Thank you for the submission of your proposal on behalf of Selwyn District Council for a non-enforcement decision to discharge Class Ab Biosolids at the Pines Waste-Water Treatment operated by Selwyn District Council under resource consent CRC131423.

Decision

Unfortunately, your proposal has been declined as the proposed activity falls outside the remit of the resource consent CRC131423.

Reason for the decision

Your proposal was reviewed by our Science Department (Soil, Hazards, Groundwater) and Zone Delivery Team (Compliance Monitoring) who indicated that:

- The data provided shows potential environmental effects (nutrient leaching, areal loading and concentrations, nutrient concentrations of biosolids, concentration of nutrient and contaminants in top 15 cm soil profile) that need to be addressed via a full assessment within the processes set out by the RMA,
- The Pines WWTP is already non-compliant with several other consents held for the site, and
- Covid-19 restrictions have now eased and would allow disposal of Class Ab biosolids.

It is my understanding that a proposal for a consent variation application was initiated by SDC to Environment Canterbury and subsequently dropped in 2013 and in mid-2019.

If you have any further query, please do not hesitate to contact me.

Yours sincerely

Andy Barbati-Ross
Zone Manager – Central

CC: Murray England – Selwyn District Council

Our ref:
Your ref:
Contact: andy.barbati-ross@ecan.govt.nz

From: Trinity White
To: Murray England; Amit Chauhan; Fouad Alkhaier
Subject: CRC153952 - Actions from todays meeting re GW monitoring
Date: Wednesday, 24 July 2019 12:18:00 PM

Good afternoon Murray and Amit,

Thank you for taking the time to meet with Fouad and I today. I thought it would be a good idea to cover off the action points form today. I have also provided the detail from my compliance report around the screening depths for your info.

Action points:

- Following SDC discussions with consultants, ECan to assist with determining required screen depths and acceptable existing bores
- SDC to provide Total Nitrogen monitoring data to Fouad

The nearest groundwater level monitoring bore (M36/0465) is located 1km south of the wastewater disposal area. Groundwater this year is reported to be at a depth of -5m RGL. The minimum groundwater level is -9.6 RGL and maximum -3.3m RGL. Therefore, the groundwater monitoring bores noted in Condition 25(a) should be screened from 2m below the lowest water level (i.e. approx. 11.6m) and 1m above the highest water level (i.e. approx. 2.3m). I have detailed the depth and screened sections of each of the monitoring bores below. Based on this information, I do not believe these bores meet the requirement of Condition 25(b).

Upgradient
BX23/0204 = 22.5m (screened 18m - 21m)
BX23/0205 = 24m (screened 21m - 24m)
BX23/0878 = 18m (screened 6m - 18m)

Downgradient
BX23/0206 = 13.9m (screened 8.9m - 13.9m)
BX23/0207 = 14m (screened 9m - 12m)
M36/7464 = 16.5m (screened 7.5m to 16.5m)
BX23/0208 = 17m (screened 11m to 14m)

Regards,

Trinity

From: Amit Chauhan
To: Maki Norman
Cc: Cinnil Thomas; Mathew Abraham; Fiona Rayner
Subject: RE: CRC153952 - Pines WWTP Rolleston - Compliance data Jul, Aug, Sept 2016
Date: Monday, 30 January 2017 10:50:51 AM

Hi Maki,

Thank you for your feedback .

Our assessments indicated that the breakdown on irrigators CP5 , CP6, (as noted in Fiona's previous mail) was the main cause of exceedance. The after effects (from Aug to Oct) of these continued into the next quarter and at the same time we had additional breakdowns. Consequently, the following pivots were out of service:

- CP3 was out of service from Oct to Dec 2016 during which period it was being repaired. This Pivot does approx. 870 m3 a day;
- We also had minor repair works on CP2 and CP5 and as a result, these pivots were not available as well for short time during the months between Oct – Dec 2016;
- With discharge restrictions on CP7, we are able to obtain a daily discharge capacity of a little over 7000 m3 when all irrigators are available for service. Our average flows are around 6000 m3. Any Pivot not available for service results in a huge imbalance in discharge flow distribution.

Though we have assigned the Repair and Maintenance of irrigators as high priority item, we still have high lead times associated with repair works as it is dependent on external vendors.

We have been keeping a close eye on the discharge volumes and application depths. Furthermore, We are working on improving the current operations as stated below:

1. Re- nozzle the Pivots to increase the instantaneous flow and adjust the speed of Pivot to achieve more efficient discharge (experimental basis);
2. Putting an alarm with a volume based trigger to give a "heads-up alarm" on discharge limits exceedance of the pivots. Currently we depend on manual calculations to keep a check on discharge limits;
3. Contingency plan specific to handling sudden spikes in plant discharge .

The CP7 – January 2016 application depth value in master sheet looks like a formula or a typo error. With the monthly discharge volume of 45119 m3 the application depth should be 3mm for CP7 in the month of January 2016.

With kind regards

Amit

From: Maki Norman [mailto:xxxx.xxxxxx@xxxx.xxxx.xx]
Sent: Monday, 23 January 2017 11:39 a.m.
To: Fiona Rayner <xxxxx.xxxxxx@xxxxxx.xxxx.xx>

Cc: Cinnil Thomas <xxxxxx.xxxxxx@xxxxxx.xxxx.xx>; Mathew Abraham <xxxxxx.xxxxxxx@xxxxxx.xxxx.xx>; Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.nz>
Subject: RE: CRC153952 - Pines WWTP Rolleston - Compliance data Jul, Aug, Sept 2016

Hi Fiona

Thank you for the data and information.
The monthly averaged hydraulic lading rate exceeding the consented 8mm/day in September will be graded when I review the Annual Report. This way, if there is a minor/technical non-compliance it will only be given non-compliance once. (It looks like exceedances were recorded in October and November also?) I am assuming AC-AI in 'Pines Master Spreadsheet' is the application depth (mm) per day?

I am also wondering, in the spreadsheet, CP7 January 2016 average application depth is 142.24mm. Is this true?

Regards
Maki

From: Fiona Rayner [mailto:xxxxx.xxxxxx@xxxxxx.xxxx.xx]
Sent: Thursday, 12 January 2017 2:06 PM
To: Maki Norman <xxxx.xxxxxx@xxxx.xxxx.xx>
Cc: Cinnil Thomas <xxxxxx.xxxxxx@xxxxxx.xxxx.xx>; Mathew Abraham <xxxxxx.xxxxxxx@xxxxxx.xxxx.xx>; Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx>
Subject: CRC153952 - Pines WWTP Rolleston - Compliance data Jul, Aug, Sept 2016

Hi Maki

Please find attached the compliance data for Jul, Aug, Sept 2016. (Data for Oct, Nov, Dec will be following shortly)

With reference to application depth of Irrigators : (Condition 8)

Flow data shows that the discharge is compliant to daily discharge with daily application depth < 20 mm across the monitoring days.

Data also shows that discharge has been compliant to permissible average monthly application depth of 8mm with irrigator CP4 as only exception which shows the application depth marginally over 8 mm in the month of September 2016. The irrigators CP1 and CP2 were off for cutting during the period between 20th Sept to 30th of Sept 2016 while CP5 & CP6 had comms breakdown, thus resulting in this extra loading CP4. We are happy to inform you that all these issues have been sorted out. Comms on CP5 & CP6 have been rectified and automation on CP7 is completed which gives us more breathing space with bulk of flow diverted to CP7. We are monitoring this closely.

We have also made minor improvements in the excel sheet for better representation of compliance condition in relation to average daily application depth & daily average to show daily compliance of 20 mm and average compliance of 8 mm.

Please let us know if you still require any further data or clarification. Preferably any queries should be directed to Amit in the first instance then Mathew and Cinnil but I would appreciate being CC'd in on any correspondence.

Kind Regards

Fiona Rayner
Water Services: Business Support Co-Ordinator
Selwyn District Council
DDI: 3472-862
Working hours: Mon-Fri 9-3pm

Selwyn District Council, 2 Norman Kirk Drive, Rolleston 7614; PO Box 90, Rolleston 7643, Christchurch
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From: Amit Chauhan
To: Maki Norman
Cc: Cinnil Thomas; Fiona Rayner
Subject: RE: CRC153952 - Pines WWTP Rolleston - Compliance data Jul, Aug, Sept 2016
Date: Monday, 24 July 2017 5:37:45 PM
Attachments: image003.jpg

Hi Maki,

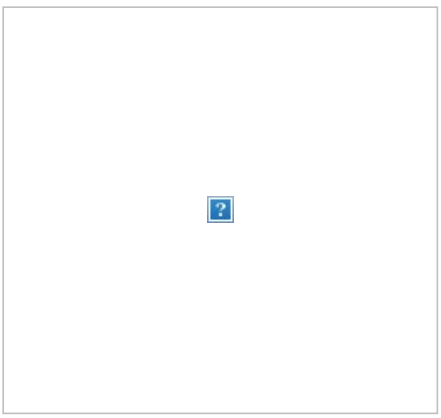
Please find below the update on discharge from Pines Pivot.

As discussed in our previous mail, we have made some improvements in the pivot operations and put better control measures which includes a manual override. This will give a forewarning of any major exceedance in discharge depths. We have some positive results from these improvements.

The table below is the summary of the average discharge depths recorded since January 2017. There has been a minor exceedance in CP7 (recorded in March 2017), however on average, in last 6 months, the values are well within 8 mm.

Month	Discharge depths - Daily average for the month (in mm)						
	Irrigator CP1	Irrigator CP2	Irrigator CP3	Irrigator CP4	Irrigator CP5	Irrigator CP6	Irrigator CP7
Jan-17	3.10	0.65	0.92	4.39	0.11	6.16	8.95
Feb-17	7	6.05	7.16	6.82	4.69	5.37	0.13
Mar-17	2.54	2.25	1.34	1.03	4.28	8.42	**11.09**
Apr-17	7.48	5.09	5.98	7.49	1.19	1.53	7.23
May-17	7.09	5.79	7.76	8.16	7.03	4.12	0.25
Jun-17	4.89	4.42	4.74	5.61	6.3	4.09	6.35
Average	**5.35**	**4.04**	**4.65**	**5.58**	**3.93**	**4.95**	**5.67**

Further, to appraise you, by end of this month, we will have more irrigable area at CP7. This will be achieved with the help of a SCADA controlled solenoid isolation valve which can selectively discharge into areas, away from the restricted discharge areas (Refer to pic below - extended area as shown in blue stripes & in yellow is the area now under irrigation). We will update you on the exact increase in area once we have this up and operating.



We are also working on the annual report and targeting to submit that by 31st of July.

Thanking you again,

Kind regards

Amit

From: Maki Norman [mailto:xxxx.xxxxxx@xxxx.xxxx.xx]

Sent: Thursday, 2 February 2017 11:45 a.m.
To: Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx>
Cc: Cinnil Thomas <xxxxxx.xxxxxx@xxxxxx.xxxx.xx>; Mathew Abraham <Mathew.Abxxxxx@xxxxxx.xxxx.xx>; Fiona Rayner <xxxxx.xxxxxx@xxxxxx.xxxx.xx>
Subject: RE: CRC153952 - Pines WWTP Rolleston - Compliance data Jul, Aug, Sept 2016

Thank you for clarification Amit.
Good to hear that the recorded high application depth from CP7 in January was an error.

Regards
Maki

From: Amit Chauhan [mailto:xxxx.xxxxxxx@xxxxxx.xxxx.xx]
Sent: Monday, 30 January 2017 10:51 AM
To: Maki Norman <xxxx.xxxxxx@xxxx.xxxx.xx>
Cc: Cinnil Thomas <xxxxxx.xxxxxx@xxxxxx.xxxx.xx>; Mathew Abraham <xxxxxx.xxxxxxx@xxxxxx.xxxx.xx>; Fiona Rayner <xxxxx.xxxxxx@xxxxxx.xxxx.xx>
Subject: RE: CRC153952 - Pines WWTP Rolleston - Compliance data Jul, Aug, Sept 2016

Hi Maki,

Thank you for your feedback .

Our assessments indicated that the breakdown on irrigators CP5 , CP6, (as noted in Fiona's previous mail) was the main cause of exceedance. The after effects (from Aug to Oct) of these continued into the next quarter and at the same time we had additional breakdowns. Consequently, the following pivots were out of service:

- CP3 was out of service from Oct to Dec 2016 during which period it was being repaired. This Pivot does approx. 870 m3 a day;
- We also had minor repair works on CP2 and CP5 and as a result, these pivots were not available as well for short time during the months between Oct – Dec 2016;
- With discharge restrictions on CP7, we are able to obtain a daily discharge capacity of a little over 7000 m3 when all irrigators are available for service. Our average flows are around 6000 m3. Any Pivot not available for service results in a huge imbalance in discharge flow distribution.

Though we have assigned the Repair and Maintenance of irrigators as high priority item, we still have high lead times associated with repair works as it is dependent on external vendors.

We have been keeping a close eye on the discharge volumes and application depths. Furthermore, We are working on improving the current operations as stated below:

1. Re- nozzle the Pivots to increase the instantaneous flow and adjust the speed of Pivot to achieve more efficient discharge (experimental basis);
2. Putting an alarm with a volume based trigger to give a "heads-up alarm" on discharge limits exceedance of the pivots. Currently we depend on manual calculations to keep a check on discharge limits;
3. Contingency plan specific to handling sudden spikes in plant discharge .

The CP7 – January 2016 application depth value in master sheet looks like a formula or a typo error. With the monthly discharge volume of 45119 m3 the application depth should be 3mm for CP7 in the month of January 2016.

With kind regards

Amit

From: Maki Norman [mailto:xxxx.xxxxxx@xxxx.xxxx.xx]
Sent: Monday, 23 January 2017 11:39 a.m.
To: Fiona Rayner <xxxxx.xxxxxx@xxxxxx.xxxx.xx>
Cc: Cinnil Thomas <xxxxxx.xxxxxx@xxxxxx.xxxx.xx>; Mathew Abraham <xxxxxx.xxxxxxx@xxxxxx.xxxx.xx>; Amit

Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx >
Subject: RE: CRC153952 - Pines WWTP Rolleston - Compliance data Jul, Aug, Sept 2016

Hi Fiona

Thank you for the data and information.
The monthly averaged hydraulic lading rate exceeding the consented 8mm/day in September will be graded when I review the Annual Report. This way, if there is a minor/technical non-compliance it will only be given non-compliance once. (It looks like exceedances were recorded in October and November also?) I am assuming AC-AI in 'Pines Master Spreadsheet' is the application depth (mm) per day?

I am also wondering, in the spreadsheet, CP7 January 2016 average application depth is 142.24mm. Is this true?

Regards
Maki

From: Fiona Rayner [mailto:xxxxx.xxxxxx@xxxxxx.xxxx.xx]
Sent: Thursday, 12 January 2017 2:06 PM
To: Maki Norman <xxxx.xxxxxx@xxxx.xxxx.xx >
Cc: Cinnil Thomas <xxxxxx.xxxxxx@xxxxxx.xxxx.xx >; Mathew Abraham <xxxxxx.xxxxxxx@xxxxxx.xxxx.xx >; Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx >
Subject: CRC153952 - Pines WWTP Rolleston - Compliance data Jul, Aug, Sept 2016

Hi Maki

Please find attached the compliance data for Jul, Aug, Sept 2016. (Data for Oct, Nov, Dec will be following shortly)

With reference to application depth of Irrigators : (Condition 8)

Flow data shows that the discharge is compliant to daily discharge with daily application depth < 20 mm across the monitoring days.

Data also shows that discharge has been compliant to permissible average monthly application depth of 8mm with irrigator CP4 as only exception which shows the application depth marginally over 8 mm in the month of September 2016. The irrigators CP1 and CP2 were off for cutting during the period between 20th Sept to 30th of Sept 2016 while CP5 & CP6 had comms breakdown, thus resulting in this extra loading CP4. We are happy to inform you that all these issues have been sorted out. Comms on CP5 & CP6 have been rectified and automation on CP7 is completed which gives us more breathing space with bulk of flow diverted to CP7. We are monitoring this closely.

We have also made minor improvements in the excel sheet for better representation of compliance condition in relation to average daily application depth & daily average to show daily compliance of 20 mm and average compliance of 8 mm.

Please let us know if you still require any further data or clarification. Preferably any queries should be directed to Amit in the first instance then Mathew and Cinnil but I would appreciate being CC'd in on any correspondence.

Kind Regards

Fiona Rayner
Water Services: Business Support Co-Ordinator
Selwyn District Council
DDI: 3472-862
Working hours: Mon-Fri 9-3pm

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From:	Amit Chauhan
To:	Trinity White
Cc:	Leila Dadian
Subject:	FW: Pines WWTP Nitrate ERP
Date:	Friday, 9 November 2018 2:41:33 PM
Attachments:	image001.png image002.png 2075107-SP-1.pdf

H Trinity,

Trust you are doing well.

Just to update you , the recent sample of bore BX23/0206 has returned lower nitrate levels (8.1mg/l).

We will continue to monitor this bore on weekly till the results stabilise. This will help to closely track of Nitrate levels in the Bore water. Also we have initiated the procurement for the new bore upstream of failed bore as suggested by you.

Thanks and regards

Amit

From: Chris Salkeld [mailto:xxxxxx@xxxxx.xx.xx]
Sent: Thursday, 8 November 2018 9:10 PM
To: Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx>
Cc: Rachel Tompkins <xxxxxx.xxxxxxxx@xxxxxx.xxxx.xx>; Darryl Collins <darryx@xxxxx.xx.xx>
Subject: Pines WWTP Nitrate ERP

Hi Amit

Just before you returned from holiday, we had a failure on one of the bores for nitrate. Ecan have been notified and a follow up sample taken (results attached). We can now advise Ecan of the result and that we will resume regular monthly testing as per the ERP.

Cheers

Chris Salkeld | Wastewater Supervisor
BSc Genetics, NZ Dip Wastewater

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Sitewise Logo

-----Original Message-----
From: Hill Laboratories Results [mailto:xxxxxxx@xxxxxxxxx.xx.xx]
Sent: Wednesday, 7 November 2018 5:16 p.m.
To: Chris Salkeld <xxxxxx@xxxxx.xx.xx>
Subject: Lab Results for: Client: Selwyn District Council; Client Ref: EWS - Nitrate Test; Order No: ; Date Reg: 03-Nov-18 10:57 a.m.; Submitter: Burtt, Liane; Lab Job No: 2075107

This email contains Hill Laboratories results for Lab Job No. 2075107.

##

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Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2075107 SPv1
Contact:	Lisa Shaw	**Date Received:**	03-Nov-2018
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	07-Nov-2018
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	EWS - Nitrate Test
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		20409 - BX23/0206 02-Nov-2018 6:00 pm				
Lab Number:		2075107.1				
Nitrite-N	g/m³	< 0.10	-	-	-	-
Nitrate-N	g/m³	8.1	-	-	-	-
Nitrate-N + Nitrite-N	g/m³	8.1	-	-	-	-

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
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser, screen level. APHA 4500-NO3- I 22nd ed. 2012 (modified).	0.10 g/m³	1
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser, screen level. APHA 4500-NO3- I 22nd ed. 2012 (modified).	0.10 g/m³	1

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

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

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.

Ara Heron BSc (Tech)
Client Services Manager - Environmental

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The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which are not accredited.

From:	Cinnil Thomas
To:	Trinity White
Cc:	Chris Salkeld; "Ian Shaw"; Leila Dadian; Amit Chauhan
Subject:	Re: CRC131414 | Notification of Increased Nitrate and Faecal Coliforms
Date:	Wednesday, 3 October 2018 3:13:59 PM

Dear Trinity,

We have received Test Results for the monitoring bores at Pines WWTP.

- **Nitrate level:** sampleBX23/0206 28-Sep-2018 7:50 am is 8.9 g/m3 which is >8

We have received an update from the CDHB regarding the increased coliforms and nitrates at the Burnham WWTP.
Our intention is to monitor Pines bores very closely, especially in the aftermath of increased Ecolis in Burnham monitoring bores with some potential that these acquirers could be interconnected.

I have Ccéd our EHO, OMC and WQO in this correspondence.

Regs
Cinnil

From: Trinity White [mailto:xxxxxxx.xxxxx@xxxx.xxxx.xx]
Sent: Friday, 28 September 2018 11:40 a.m.
To: Cinnil Thomas <xxxxxx.xxxxxx@xxxxxx.xxxx.xx>
Subject: RE: CRC131414 | Notification of Increased Nitrate and Faecal Coliforms

Thank you Cinnil,

Seems to be a bit of a problem in the area at the moment. As discussed, Burnham Military Camp is having similar issues. Please keep in contact regarding this matter.

Kind regards,

Trinity

From: Cinnil Thomas <xxxxxx.xxxxxx@xxxxxx.xxxx.xx >
Sent: Friday, 28 September 2018 10:55 AM
To: Trinity White <xxxxxxx.xxxxx@xxxx.xxxx.xx >
Cc: Chris Salkeld <xxxxxx@xxxxx.xx.xx>; 'Lisa Shaw' <x.xxxx@xxxxxxxxxxxxx.xx.xx >; Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx >; Leila Dadian <xxxxx.xxxxxx@xxxxxx.xxxx.xx >
Subject: Re: CRC131414 | Notification of Increased Nitrate and Faecal Coliforms
Importance: High

Dear Trinity,

Cc Chris (OMC), Lisa (Sampler), Amit, Leila

Re: CRC131414 | Notification of Increased Nitrate and Faecal Coliforms

As noted in Pines II WWTP - Excursion Response Plans and in accordance with conditions under **Consent CRC131414 condition 25.d**, I wish to notify you on the following as a general alert:

- **Bore BX23/0206** - Nitrate result is >8 mg/l and =30% greater than upstream nitrate
- **Bore BX23/20416** - has failed for Faecal coliforms, at >50cfu/100mL.

Re-samplings have been organised.

Please do not hesitate to contact me in case of any clarifications.

Regs

Cinnil Thomas

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From: Trinity White
To: Amit Chauhan
Subject: CRC153952 - The Pines annual report and further information.
Date: Wednesday, 17 July 2019 1:57:00 PM

Hello Amit,

Can you please confirm the annual report is on track to be submitted end of July as agreed? As you are aware compliance alongside groundwater are looking into the Burnham area at present and I am keen to ensure this consent is fully monitored as soon as possible.

Thank you for providing the pivot data. However, I am missing quite a bit of information required to assess compliance (which I assume will come within the annual report). Can you please provide the following information or ensure it is in the annual report in its raw form:

- Raw discharge data (not summarised or averaged) for July 2018 to June 30 2019
- Design capacity of the sludge digester.
- Influent records
- (Condition 4) Service records to demonstrate UV system is calibrated and serviced annually.
- (Condition 19 & 20) Can you please forward me a copy of the current Management Plan

Kind regards,

Trinity

From: Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx>
Sent: Wednesday, 10 July 2019 9:21 AM
To: Trinity White <xxxxxxx.xxxxx@xxxx.xxxx.xx>
Subject: Pines Pivot Data 2019.xlsx

Hi Trinity,

Trust you are doing well.

As requested, Please find attached the updated Pines Pivot data for your reference.

Kind regards

Amit

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www.ecan.govt.nz

4 August 2017

Selwyn District Council
PO Box 90
Rolleston 7643

Dear Sir/Madam

Compliance Monitoring Report
Selwyn - Waihora Water Management Zone

Please find enclosed your compliance monitoring report for the following activity. It is important that you read this report carefully.

Consent number:	CRC153952
Location:	Burnham School Road, Main South Road & Brookside Road, ROLLESTON
Description:	To discharge contaminants to land and to air.

Overall consent compliance: **Non-compliance No action req**

One or more of the conditions of your resource consent have not been complied with. Please see the reasons below for non-compliance.

Reason(s) for non-compliance:

Conditions 7 and 8.

If you would like to discuss this report, please contact me on (03) 365-3828.

Yours sincerely

Maki Norman
Resource Management Officer II Monitoring and Compliance - Selwyn, Waihora

Doc No: C17C/137045
Your Customer No: EC118692
File No(s): CRC153952

Consent No: ***CRC153952***

Description of consent	**Commencement Date**
To discharge contaminants to land and to air.	06 Mar 2015
Location	**Expiry Date**
Burnham School Road, Main South Road & Brookside Road, ROLLESTON	17 Dec 2045

Conditions & compliance

1 The discharge shall be only:

a. Treated wastewater originating from the Pines Wastewater Treatment Facility located at Lot 1 DP 309881, Burnham School Road, Burnham as shown on Plan CRC153952A; and

b. Odour and aerosols associated with the spray irrigation of treated wastewater.

Compliance Report:
Complies

2 The discharge shall only occur within Wastewater Discharge Area A, B and C shown on Plan CRC153952B, and bound by Topo50 map references:

a. Topo50 BX23 459 672, BX23 472 699, BX23 467 708 and BX23 451 699; and

b. Topo50 BX23 453 700, BX23 472 710, BX23 468 717, BX23 454 710, BX23 455 709, BX23 449 716, BX23 450 705 and BX23 451 705.

c. The total combined volume of treated wastewater discharged under this consent and CRC131423 shall not exceed 25,614 cubic metres per day over the wastewater irrigation areas shown on Plan CRC153952B.

d. For the purposes of compliance with this condition the consent holder shall operate a flow meter which continuously monitors the volume of wastewater discharged to the irrigation area.

Compliance Report:
Complies

The discharge of wastewater occurs within the consented area as per (a) and (b) of this consent condition.
(c) The total volume discharged did not exceed the daily maximum volume of 25,614 cubic metres during the 2016-2017 reporting year.
(d) A flow meter is installed.

3 The consent holder shall ensure that influent volumes of wastewater do not exceed the operating capacity of the treatment and irrigation systems.

Compliance Report:
Complies

The irrigation area has progressively been increased to ensure the operating capacity is adequate.

---

4 The consent holder shall ensure that:

a. The discharge receives ultra-violet disinfection prior to irrigation.

b. The median concentration of faecal coliforms in the discharge shall not exceed 500 faecal colony forming units per 100 millilitre sample.

c. An alarm is fitted to the ultra-violet disinfection system which activates in the event that an inadequate dose is applied.

The ultra-violet disinfection system is calibrated and serviced annually.

Compliance Report:
Complies

The median concentration of faecal coliforms was below the trigger level each month during the 2016-2017 reporting period.

---

5 Alarm systems shall be installed at the treatment plant to warn of a power failure or a failure of any critical treatment system components. Standby power generation shall be available at all times the plant is operational.

Compliance Report:
Complies

---

6 The discharge shall occur only via a spray irrigation system.

Compliance Report:
Complies

Wastewater is discharged via centre pivot irrigators.

---

7 The application depth of the discharge shall not exceed 64 millimetres over any consecutive five (5) day period, and no single application shall exceed a depth of 20 millimetres.

Compliance Report:
Non-compliance No action required

There were 19 occasions when the 5 consecutive day depth of discharge exceeded the trigger level of 64 mm. The greatest non-complying irrigation depth was 115.8 mm. This is significantly non-compliant.

There also were 15 occasions when single application depths were greater than the trigger level of 20 mm. The non-complying application depths varied between 23.4 and 40.3 mm.

The report states that the application depths have been compliant with this condition since changes were made to the SCADA system used onsite. Please monitor the application depths closely.

---

8 The discharge shall not exceed a monthly average hydraulic loading rate of eight (8) millimetres per day.

Compliance Report:
Non-compliance No action required

The monthly average hydraulic loading rates exceeded the trigger level of 8 mm/day from Centre Pivot 5 (November and December 2016) and Centre Pivot 7 (September. October, December 2016, January, March, April and June 2017).

It is stated in the Annual Report that Centre Pivots 2, 3 and 5 were not available at times due to repairs.
I was also informed by Amit Chauhan on 25 July 2017 that the discharge area under Centre Pivot 7 is to be increased. I appreciate good communication and proactive approach to resolving the issues.

---

9 a. Prior to irrigation, the discharge shall be treated to ensure the following standards are met:

Parameter	Median*	95th Percentile*
Biochemical Oxygen Demand (BOD)	15	60
Suspended Solids	20	90
Total Nitrogen	7	35
Faecal Coliforms (cfu/100ml)	500	1,000

*All values are expressed in grams per cubic metre except faecal coliforms which are expressed colony-forming units per 100 millilitre sample.

b. In order to demonstrate compliance with Condition 9(a), samples of wastewater shall be taken from the pump chamber and analysed at least monthly.

Compliance Report:
Complies

The wastewater was treated to meet the standards under this condition prior to the discharge during the 2016-2017 reporting period.

---

10 There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours.

Compliance Report:
Not monitored

This condition will be monitored during site visits.

---

11 The discharge shall be managed to ensure that there shall be no discharge within 20 metres of any surface water body and the run-off of wastewater into any surface waterbody is prevented.

Compliance Report:
Not monitored

---

12 All stockwater races within the wastewater irrigation areas shown on Plan CRC153952D shall be piped or otherwise closed by 28 February 2017.

Compliance Report:
Complies

---

13 The discharge of treated wastewater shall only occur within the area labelled "Discharge Area A, B and C" on Plan CRC153952B according to the following setback distances:

a. Discharge Area A" no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *"Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land" or its successor, with wastewater spray irrigation set back by:*

i. *No less than 40 metres from any site boundary where complying shelter is established*; or*

ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.*

b. Within "Discharge Area B" no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *"Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land" or its successor, with wastewater spray irrigation set back by:*

i. *No less than 15 metres from any site boundary where complying shelter is established*; or*

ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.*

c. Within "Discharge Area C" no wastewater spray irrigation shall commence within 10 metres of any site boundaries.

Compliance Report:
Complies

---

14 a. The consent holder shall undertake shelter planting as necessary to ensure that the effects of spray and aerosols from wastewater irrigation are not offensive or objectionable beyond the site boundary.* Note Wastewater spray irrigation is also precluded from occurring on Pt Lot 2 DP 82068 (as per the conditions of the designation)

b. Effluent shall not be applied:

i. Onto land within 50 metres of any active community used for water extraction not owned by the holder of this consent and any community supply protection zones;

ii. Onto land within 20 metres of any surface waterway;

iii. Onto ground with no vegetative cover;

iv. Onto ground where surface ponding is occurring; and

v. There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours.

c. The consent holder shall prepare a Landscape Plan and shall provide it to the Canterbury Regional Council, Attn: RMA Compliance and Enforcement Manager prior to the commencement of planting confirming that the planting is consistent with the requirements of the Department of Public Health Public Health Services

1992 Guideline or its successor. The Landscape Plan shall include, but not be limited to, the following information:

i. The location and extent of each area of shelter planting.

ii. The species to be planted and the anticipated height of each plant following establishment.

iii. The minimum plant size and spacing required at planting to achieve the minimum plant height defined in clause (b) of this condition prior to the commencement of wastewater spray irrigation.

d. Once established the landscaping shall be maintained for the duration of the exercise of the consent, with any dead, dying or diseased plants being replaced within one growing season within plants of a similar species and in accordance with the planting specified in the Landscape Plan required under clause (c).

Compliance Report:
Not monitored

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15 a. The discharge area shall be fenced to prevent stock, vehicle and public access.

b. At either end of the discharge area along Burnham School Road an easy visible sign should state " Potential Health Risks from Aerosolised treated sewage in this area".

Compliance Report:
Complies

---

16 A notice shall be erected and maintained at all entrances to the site. This notice shall be legible at a distance of five (5) metres and shall inform the public of the nature of the activities occurring at the site, and that the disposal or waste by any other person is prohibited.

Compliance Report:
Not monitored

---

17 The discharge shall be managed to ensure that:

a. Aerosols and spray-drift arising from the discharge do not cause offensive or objectionable effects beyond the boundary of the discharge area.

b. Any odour resulting from spray irrigation of wastewater shall not result in offensive or objectionable effects on the environment beyond the boundary of the irrigated area.

Compliance Report:

Not monitored

This condition will be monitored during site inspections.

18

a. All parts of the discharge area receiving wastewater shall be operated as a cut and carry operation.

b. There shall be no harvesting of crops within 48 hours of any wastewater irrigation.

c. All pasture harvested from the irrigation areas shall be removed for off-site disposal.

Compliance Report:

Complies

The Annual Report states that the cut and carry pasture management regime is operated in accordance with (b) of this condition. Please ensure that harvested grass is removed from the site.

---

19 A Management Plan shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, at least two (2) months prior to the exercise of this consent. The Management Plan shall:

a. Set out how the activity authorised by this consent shall be operated to enable compliance with the consent conditions.

b. Be maintained at all times and any changes to the Management Plan shall be submitted to the Canterbury Regional Council prior to those changes taking effect.

Compliance Report:

Complies

---

20 The Management Plan referred to in Condition 19 shall include, but not be limited to, the following:

a. The method of sampling chemicals, quantities of wastewater and frequency of sampling throughout the operation.

b. The testing and calibration of all systems including backup generator, telemetry, and flow meters.

c. Sub-condition cancelled.

d. The monthly monitoring programme of the onsite bores identified on Plan CRC153952C.

Compliance Report:
Complies

---

21 The discharge shall be sampled from the irrigation pump chamber once per month and analysed for the following:

a. Biochemical Oxygen Demand.

b. Total Suspended Solids.

c. Total Kjeldahl Nitrogen.

d. Ammoniacal Nitrogen.

e. Faecal coliforms.

Compliance Report:
Complies

Sampling of wastewater and analyses were carried out as required.

---

22 Daily records shall be kept of the following:

a. The volume of wastewater applied to land.

b. The irrigation zone over which the discharge is applied.

c. The depth of the application of wastewater.

Compliance Report:
Complies

Records of the discharge are kept as required.

---

23 Monthly records shall be kept of the following:

a. The total volume of wastewater applied.

b. The total depth of wastewater applied.

c. The average effluent hydraulic loading rate.

d. The nitrogen loading rate (expressed as kilograms of nitrogen per hectare).

e. The mean dry weight of pasture removed from the site.

Compliance Report:

Complies

Monthly nitrogen loading data were included in the Annual Report.

---

24 Prior to the exercise of the consent, the consent holder shall review and update as necessary the 'Excursion Response Plans' (ERP) included in the application to be consistent with the conditions of consent, and submit a copy of the revised ERP to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager. Thereafter the ERP shall be maintained at all times and any changes to the ERP shall be submitted to the Canterbury Regional Council prior to those changes taking effect.

Compliance Report:

Complies

---

25 For the purposes of monitoring the effects of the discharge on groundwater quality, in reference to the bores identified in condition (20):

a. The consent holder shall establish and maintain a minimum of three (3) on-site monitoring bores located down-gradient of the irrigation area and two (2) on-site monitoring bores located up-gradient of the irrigation area for the duration of this consent.

b. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall have screened sections extending from two (2) metres below the lowest water level to one (1) metre above the highest water level.

c. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall be sampled and analysed at least monthly for nitrate nitrogen and Faecal coliform:

d. In the event that the:

i. concentration of nitrate nitrogen in any of the groundwater samples collected from the down-gradient monitoring bores referred to in clause (a) of this condition exceeds eight (8) milligrams per litre and is at least 30 per cent greater than the nitrate nitrogen concentration in the up-gradient bores also referred to in clause (a) of this condition; or

ii. Faecal coliforms exceeds 50 coliform forming units (cfu)/ per 100 millilitres in any of the monitoring bores established in accordance with clause (a) of this condition;

Then the consent holder shall follow the response procedure outlined in the Excursion Response Plan.

Compliance Report:
Complies

Monitoring bores have been installed. The groundwater monitoring results have indicated high concentration of nitrate-nitrogen in the downgradient bores since February 2016. The residents were notified as outlined in ERP.

A review of the groundwater quality data in the wider area indicates that the nitrate-nitrogen concentration is already high upgradient of the Pines Wastewater Treatment Plant. It is unlikely the discharge activity at Pines is the direct cause of the high concentration of nitrate-nitrogen in the downgradient monitoring bores.

I appreciate that SDC continues monitoring the water quality closely.

---

26 For the purposes of monitoring the effects of the discharge on soils:

a. Samples of soil shall be collected twice annually from the land beneath each centre pivot irrigator or k-line irrigation area that has received treated wastewater irrigation in the previous six (6) months.

b. Sampling shall occur between a depth of zero (0) and 50 millimetres.

c. A minimum of four (4) samples shall be taken from each area sampled and all samples from the wastewater irrigation site shall be combined into a single composite sample and be analysed for the following:

i. Total cadmium

ii. Total chromium

iii. Total copper

iv. Total lead

v. Total nickel

vi. Total zinc

vii. Total nitrogen

viii. Total mercury

ix. Total arsenic

Compliance Report:
Complies

Soil sampling was carried out as required during the 2016-2017 reporting period.

---

27 a. If any of the results of any of the analysed samples in accordance with condition 26 exceed the thresholds specified in clause (b) of this condition the consent holder shall:

i. Cease wastewater irrigation over that irrigation area.

ii. Advise the Canterbury Regional Council within ten (10) days of the receipt of the results, and outline the steps taken to address elevated soil concentrations, including any remediation or mitigation measures.

iii. Not recommence wastewater irrigation over that irrigation area until further sampling demonstrates to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, compliance with the thresholds specified in clause (b) of this condition.

b.

c.

Trace Element	Limit (milligrams per kilogram) dry weight
Total Cadmium	1
Total Chromium	600
Total Copper	100
Total Lead	300
Total Nickel	60
Total Zinc Total Mercury	300 1
Total Arsenic	20

Compliance Report:
Complies

Soil samples were taken on 29 July 2016 and 19 January 2017. Samples were analysed for all required parameters. The results show that the trigger levels were not exceeded.

---

28 All samples required under this consent shall be taken by a suitably qualified and experienced person, and shall be analysed using methods approved by the American Public Health Association or the American Society for the Testing of Materials by a laboratory that is accredited for that method of analysis by International Accreditation New Zealand (IANZ) or by an organisation with a mutual agreement with IANZ.

Compliance Report:
Complies

Sample analyses were carried out by Hill Laboratories.

---

29 The results of all samples taken under this consent shall be provided to the Canterbury Regional Council within ten (10) working days of receipt of the samples.

Compliance Report:
Complies

---

30 The consent holder shall provide the Canterbury Regional Council with an Annual Monitoring Report each year commencing 12 months from the date of the exercise of this consent. The Annual Monitoring Report shall include, but not be limited to:

a. Monthly monitoring records.

b. All sampling results required under the conditions of consent.

c. Annual average nitrogen loading rate.

d. A record of any complaints from members of the public and actions taken.

e. Status of compliance with consent conditions.

f. Reasons for any non-compliances and actions taken or planned to prevent re-occurrences.

This report shall then become the formal record of results for that year.

Compliance Report:
Complies

The 2016-2017 Annual Report was received on 31 July 2017.

---

31 a. Prior to the construction of the Pines Wastewater Treatment Facility, design plans shall be certified by a Chartered Professional Engineer (CPEng) with at least five (5) years experience in the design and construction of wastewater treatment systems to confirm that the system has been suitably designed to achieve or better the values set out in Condition 10(a).

b. A copy of the certified design plans shall be submitted to the Canterbury Regional Council, Attention: Environmental Compliance Manager, at least one month prior to construction.

Compliance Report:
Not monitored

---

32 a. Prior to the exercise of this consent, the consent holder shall establish a reticulated water supply which provides sufficient water to cover the property holders domestic needs to the properties located within the area bound by Brookside Road, Ellesmere Junction Road and Edwards Road.

b. The consent holder shall maintain the reticulated supply for the duration of this consent and ensure the quality of water supplied complies with New Zealand Drinking Water Standards 2008 criteria.

Compliance Report:
Complies

---

33 a. In the event of any disturbance of Koiwi Tangata (human bones) or taonga (treasured artefacts), during the construction or installation of the treatment and disposal facilities, the consent holder shall immediately:

i. Cease earthmoving operations in the affected area

ii. Mark off the affected area until earthmoving operations recommence

iii. Advise the Canterbury Regional Council of the disturbance

iv. Advise the Upoko Runanga of Te Taumutu Runanga, or their representative (contact information can be obtained from the Canterbury Regional Council), and the New Zealand Historic Places Trust, of the disturbance.

b. Earthmoving equipment operations shall not recommence until either;

i. the consent holder provides a certificate in writing to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, signed by Upoko Runanga of Taumutu, or their representative(s), stating that appropriate action has been undertaken in relation to the discovered culturally sensitive material; or

ii. after five (5) working days after advising the Taumutu Runanga, a certificate signed by an archaeologist (i.e., a person with a post graduate degree in archaeology, and who is a member of the New Zealand Archaeological Association) is provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that states that in the archaeologist's opinion appropriate action has been

undertaken in relation to the discovered culturally sensitive material. That certificate shall detail the action that has been undertaken by the consent holder. A copy of the archaeologist's qualifications shall also be provided with any such certificate.

Compliance Report:
Not monitored

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34 The lapsing provisions of Section 125 of the Resource Management Act 1991 shall not apply to this consent until 31 March 2030.

Compliance Report:
Complies

This consent has been exercised.

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35 The Canterbury Regional Council may, once per year, on any of the last five (5) working days of March or September serve notice of its intention to review the conditions of this consent for the purposes of either of the following:

a. Dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.

b. Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

Compliance Report:
Complies

There currently are no plans to review this consent.

---

36 When discharging wastewater to land adjacent to the Plan Change land, the consent holder shall ensure that:

a. The discharge shall be in an aerobic state.

b. The dissolved oxygen concentration shall not be less that a trigger level of 0.5 grams per cubic metre.

c. The dissolved oxygen concentration in the discharge shall be continuously monitored and an alarm fitted that activates in the event that the dissolved oxygen concentration is less than the trigger level in clause (b) of this condition.

d. The dissolved oxygen monitoring device shall be calibrated and serviced annually.

Compliance Report:
Complies

Plan Change 8 became operative in 2012 thus this condition is operational. DO levels are monitored continuously to ensure that the DO level does not exceed 0.5 g/m^3. The DO meter is calibrated and serviced annually.

---

37 The requirements of Conditions 36(c) and 36(d) shall be undertaken by the consent holder for a minimum of at least two (2) years from the date of commencement of spray irrigation of wastewater to land in accordance with this consent.

Compliance Report:
Complies

The DO levels are monitored as required. In 2015 non-compliance Condition 36 was noted. The alarm system became operational in May 2016. I suggest that the DO levels continue to be monitored.

---

38 The requirements of Conditions 36(c) and 36(d) shall no longer apply upon provision of a certificate signed by the person responsible for designing the wastewater irrigation system, or by a chartered Professional Engineer (CPEng), to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, certifying that;

a. dissolved oxygen in the discharge has been continuously monitored for at least two (2) years; and

b. the minimum level of dissolved oxygen concentration specified in Condition 36(b) has been continuously met or exceeded during that two (2) year period.

Compliance Report:
Not monitored

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39 If the minimum level of dissolved oxygen concentration specified in Condition 36(b) is breached, or the median concentration of faecal coliforms is greater than 500 colony forming units per 100 millilitre sample, then the following provisions shall apply:

a. Any discharge of treated wastewater to land adjacent to the Plan Change land shall be setback no less that 200 metres from the common boundary as shown on Plan CRC101109.1C when the winds of any strength are from 170°N to 310°N; provided that

b. When the winds are not from 170°N to 310°N any discharge of treated wastewater shall comply with the setback distances prescribed by Condition 40.

Compliance Report:
Not operational

The hourly average of DO levels did not exceed the trigger level of 0.5 $g.m^3$ during the 2016-2017 reporting period. The discharge from Centre Pivot 5 stops when low DO levels are measured.

The E. Coli levels did not exceed the trigger level of 500 cfu/100 millilitre.

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40 In respect of shelter belt planting:

a. The consent holder shall establish a shelter belt comprising three rows of closely planted evergreen trees along the common boundary defined under Condition 39(a).

b. No discharge of treated wastewater to land shall occur within 150 metres of that common boundary until;

   i. the trees referred to in Condition 40(a) have reached a consistent minimum height of three (3) metres and have developed into a dense continuous shelter belt without gaps; and

   ii. the consent holder has demonstrated to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that the boundary plantings comply with Condition 40(b)(i).

c. Following confirmation pursuant to condition 40(b)(ii), discharge of treated wastewater to land may occur up to 25 metres from the common boundary defined under Condition 39(a).

Compliance Report:
Complies

Shelterbelts have been planted along the internal boundaries. The discharge shall not occur until the height of the shelterbelt reaches 3 metres. Currently no discharge is occurring within 150 metres of the common boundary.

---

41 There shall be no end guns associated with the wastewater spray irrigation system located on Pt Lot 1 DP 65117 or Pt RS 33357, being that part of the land subject to this consent located north or Burnham School Road.

Compliance Report:
Not monitored

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42 In the event of cessation of irrigation from the wastewater spray irrigation system for more than 24 hours on land adjacent to the Plan Change land, the consent holder shall not start up irrigation from the spray irrigation system within 200 metres of the common boundary defined under Condition 39(a).

Compliance Report:
Complies

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43 No discharge of treated wastewater to land from a spray irrigation system shall occur within 150 metres of the common boundary defined under Condition 38(i) unless:

a. The spray nozzles are no more than two (2) metres above ground level.

b. The spray nozzles produce large consistent droplets such as produced by the Nelson R3000 brand or similar product.

c. The operating pressure at the spray irrigation nozzle does not exceed 103 kilopascals (kPA).

Compliance Report:
Complies

The Annual Report states that the spray droppers are within 2 metres of the ground level, Nelson R3000 nozzles are used, which are designed to operate within a pressure range of 80 - 100 kPa.

General comments

The 2016- 2017 Annual Report was received on 31 July 2017.

Conditions 7 and 8 have been graded as being non-compliant. However, I am satisfied with the actions that have already been taken to rectify the issues.

Thank you for working with Environment Canterbury with prompt communication and proactive approach towards achieving full compliance.

If you have any queries regarding the monitoring of your consent please contact me on 0275370355 or email maki.norman@ecan.govt.nz. For all general enquiries please contact Customer Services on 0800 324 636.

Date Inspected: 01 Aug 2017

Monitored By: Maki Norman

Signature: _____

Resource Management Officer II Monitoring and Compliance - Selwyn, Waihora

General information

Canterbury Regional Council Obligations

Under Section 35 of the Resource Management Act 1991, the Canterbury Regional Council has a duty to monitor all resource consent exercised within its region, to make sure all the conditions are being complied with.

Monitoring Frequency

The frequency with which your consent is monitored will vary according to the type of activity your consent authorises, the conditions imposed and the extent to which you have complied with these conditions on previous visits. **If you fully comply with all conditions then frequency will reduce to the minimum set for the activity.**

Costs

It is the Council's policy to recover all actual and reasonable costs of compliance monitoring of resource consents.

Environment Canterbury
Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636
200 Tuam Street
PO Box 345
Christchurch 8140
E. ecinfo@ecan.govt.nz
www.ecan.govt.nz

21 November 2017

Selwyn District Council
Attn To: Amit Chauhan
PO Box 90
Rolleston 7643

Dear Amit

Compliance Monitoring Report
Selwyn - Waihora Water Management Zone

Please find enclosed your compliance monitoring report for the following activity. It is important that you read this report carefully.

Consent number:	CRC153952
Location:	Burnham School Road, Main South Road & Brookside Road, ROLLESTON
Description:	To discharge contaminants to land and to air.

Overall consent compliance: **Complies**

Thank you for complying with the resource consent conditions that have been monitored.

Reminder
Please continue to supply monthly sample results and records in relation to conditions 7 and 8.

If you would like any further information regarding this report please do not hesitate to contact me.

Kind regards,

Katie Nagy
Resource Management Officer I Monitoring and Compliance - Selwyn, Waihora

Doc No: *C17C/201218*
Your Customer No: *EC118692*
File No(s): *CRC153952*

Consent No: ***CRC153952***

Description of consent	**Commencement Date**
To discharge contaminants to land and to air.	06 Mar 2015
Location	**Expiry Date**
Burnham School Road, Main South Road & Brookside Road, ROLLESTON	17 Dec 2045

Conditions & compliance

1 The discharge shall be only:

a. Treated wastewater originating from the Pines Wastewater Treatment Facility located at Lot 1 DP 309881, Burnham School Road, Burnham as shown on Plan CRC153952A; and

b. Odour and aerosols associated with the spray irrigation of treated wastewater.

Compliance Report:

Complies

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2 The discharge shall only occur within Wastewater Discharge Area A, B and C shown on Plan CRC153952B, and bound by Topo50 map references:

a. Topo50 BX23 459 672, BX23 472 699, BX23 467 708 and BX23 451 699; and

b. Topo50 BX23 453 700, BX23 472 710, BX23 468 717, BX23 454 710, BX23 455 709, BX23 449 716, BX23 450 705 and BX23 451 705.

c. The total combined volume of treated wastewater discharged under this consent and CRC131423 shall not exceed 25,614 cubic metres per day over the wastewater irrigation areas shown on Plan CRC153952B.

d. For the purposes of compliance with this condition the consent holder shall operate a flow meter which continuously monitors the volume of wastewater discharged to the irrigation area.

Compliance Report:

Complies

The discharge is via centre pivot irrigators within the consented discharge area.
A map of the pivot layout was provided, showing the location of CP1-CP7. A new pivot irrigator is planned along Burnham Road .
CP7 is managed within the required buffer zones, which is illustrated in the provided map.

3 The consent holder shall ensure that influent volumes of wastewater do not exceed the operating capacity of the treatment and irrigation systems.

Compliance Report:
Not monitored

The irrigation area will be increased, as mentioned under condition 2.
Additionally, the wastewater treatment plant is currently undergoing upgrades. The new bioreactor is scheduled to be operational in July 2018.

---

4 The consent holder shall ensure that:

a. The discharge receives ultra-violet disinfection prior to irrigation.

b. The median concentration of faecal coliforms in the discharge shall not exceed 500 faecal colony forming units per 100 millilitre sample.

c. An alarm is fitted to the ultra-violet disinfection system which activates in the event that an inadequate dose is applied.

The ultra-violet disinfection system is calibrated and serviced annually.

Compliance Report:
Complies

All effluent is UV treated prior to discharge. Wastewater is sampled regularly and samples are analysed by Hill Laboratories.
The audit sample taken on 26 October 2017 had a faecal coliform result of 150 cfu/ 100 mL.

---

6 The discharge shall occur only via a spray irrigation system.

Compliance Report:
Complies

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7 The application depth of the discharge shall not exceed 64 millimetres over any consecutive five (5) day period, and no single application shall exceed a depth of 20 millimetres.

Compliance Report:
Complies

According to Ken Winsloe (Water Services Manager SICON) and Chris Salkeld (Plan Supervisor SICON) application depths of discharge have been < 64 mm over a consecutive 5

day period and < 20 mm per application since the changes to the SCADA system have been made.

Please provide the application records from August 2017- now so that I can verify compliance with this condition.

---

8 The discharge shall not exceed a monthly average hydraulic loading rate of eight (8) millimetres per day.

Compliance Report:
Complies

Please refer to condition 7 for further comments.

---

9 a. Prior to irrigation, the discharge shall be treated to ensure the following standards are met:

Parameter	Median*	95th Percentile*
Biochemical Oxygen Demand (BOD)	15	60
Suspended Solids	20	90
Total Nitrogen	7	35
Faecal Coliforms (cfu/100ml)	500	1,000

*All values are expressed in grams per cubic metre except faecal coliforms which are expressed colony-forming units per 100 millilitre sample.

b. In order to demonstrate compliance with Condition 9(a), samples of wastewater shall be taken from the pump chamber and analysed at least monthly.

Compliance Report:
Complies

The audit sample results from 26 October 2017 are below:

-TSS: 6 g/m^3
-Total Nitrogen: 2.8 g/m^3
-Nitrate and Nitrite: 0.54 g/m^3
-TKN: 2.2 g/m^3
-Phosphorus: 4.3 g/m^3
-TBOD5: 5 g O_2/m^3
-Faecal Coliforms: 150 cfu/100 mL

---

13 The discharge of treated wastewater shall only occur within the area labelled “Discharge Area A, B and C” on Plan CRC153952B according to the following setback distances:

a. Discharge Area A” no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *“Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land” or its successor, with wastewater spray irrigation set back by:*

   i. *No less than 40 metres from any site boundary where complying shelter is established*; or*

   ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.*

b. Within “Discharge Area B” no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *“Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land” or its successor, with wastewater spray irrigation set back by:*

   i. *No less than 15 metres from any site boundary where complying shelter is established*; or*

   ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.*

c. Within “Discharge Area C” no wastewater spray irrigation shall commence within 10 metres of any site boundaries.

Compliance Report:

Complies

a. no discharge occurs on discharge area A at this stage.
b. -c. discharge to areas B and C comply with the conditions of this consent. Shelter trees are over 3m in height and buffer zones are being adhered to. See comments under condition 2 for further detail.

15 a. The discharge area shall be fenced to prevent stock, vehicle and public access.

b. At either end of the discharge area along Burnham School Road an easy visible sign should state " Potential Health Risks from Aerosolised treated sewage in this area".

Compliance Report:
Complies

The area is fully fenced and visible signs have been erected.

---

16 A notice shall be erected and maintained at all entrances to the site. This notice shall be legible at a distance of five (5) metres and shall inform the public of the nature of the activities occurring at the site, and that the disposal or waste by any other person is prohibited.

Compliance Report:
Complies

---

19 A Management Plan shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, at least two (2) months prior to the exercise of this consent. The Management Plan shall:

a. Set out how the activity authorised by this consent shall be operated to enable compliance with the consent conditions.

b. Be maintained at all times and any changes to the Management Plan shall be submitted to the Canterbury Regional Council prior to those changes taking effect.

Compliance Report:
Not monitored

The latest version of the management plan is dated February 2013. Please ensure that the updates to the plant are formalised within the management plan and an updated version is provided to Environment Canterbury,

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22 Daily records shall be kept of the following:

a. The volume of wastewater applied to land.

b. The irrigation zone over which the discharge is applied.

c. The depth of the application of wastewater.

Compliance Report:
Unable to determine compliance

Please provide records from August 2017- now.

---

23 Monthly records shall be kept of the following:

a. The total volume of wastewater applied.

b. The total depth of wastewater applied.

c. The average effluent hydraulic loading rate.

d. The nitrogen loading rate (expressed as kilograms of nitrogen per hectare).

e. The mean dry weight of pasture removed from the site.

Compliance Report:
Unable to determine compliance

Please provide records from August 2017- now.

---

25 For the purposes of monitoring the effects of the discharge on groundwater quality, in reference to the bores identified in condition (20):

a. The consent holder shall establish and maintain a minimum of three (3) on-site monitoring bores located down-gradient of the irrigation area and two (2) on-site monitoring bores located up-gradient of the irrigation area for the duration of this consent.

b. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall have screened sections extending from two (2) metres below the lowest water level to one (1) metre above the highest water level.

c. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall be sampled and analysed at least monthly for nitrate nitrogen and Faecal coliform:

d. In the event that the:

i. concentration of nitrate nitrogen in any of the groundwater samples collected from the down-gradient monitoring bores referred to in clause

(a) of this condition exceeds eight (8) milligrams per litre and is at least 30 per cent greater than the nitrate nitrogen concentration in the up-gradient bores also referred to in clause (a) of this condition; or

ii. Faecal coliforms exceeds 50 coliform forming units (cfu)/ per 100 millilitres in any of the monitoring bores established in accordance with clause (a) of this condition;

Then the consent holder shall follow the response procedure outlined in the Excursion Response Plan.

Compliance Report:

Complies

Monitoring bores have been installed. The previous monitoring report dated 1 August 2017 stated that high concentrations of nitrate-nitrogen have been detected in the downgradient bores since February 2016. However, a review of the groundwater quality data in the area indicates that high nitrate-nitrogen concentrations are present upgradient of the treatment plant and therefore it is unlikely that the discharge from the pines WWTP is the direct cause of the high concentrations.

Since 1 August 2017, nitrate-nitrogen results have been higher than 8 mg/L
-in BX23/0207 (24/08/2017 - 8.9 mg/L)
-in BX23/0206 (20/09/2017 - 9.5 mg/L)

Both results were more than 30% greater than the upgradient concentrations.
Nitrate-nitrogen concentrations in bore M36/7464 have been consistently below the trigger value since 24 August 2017 (previously as high as 14.2 mg/L).

Faecal coliform concentrations have been consistently below 50 cfu/ 100 mL in all of the monitoring bores.

---

26 For the purposes of monitoring the effects of the discharge on soils:

a. Samples of soil shall be collected twice annually from the land beneath each centre pivot irrigator or k-line irrigation area that has received treated wastewater irrigation in the previous six (6) months.

b. Sampling shall occur between a depth of zero (0) and 50 millimetres.

c. A minimum of four (4) samples shall be taken from each area sampled and all samples from the wastewater irrigation site shall be combined into a single composite sample and be analysed for the following:

i. Total cadmium

ii. Total chromium

iii. Total copper

iv. Total lead

v. Total nickel

vi. Total zinc

vii. Total nitrogen

viii. Total mercury

ix. Total arsenic

Compliance Report:
Unable to determine compliance

The last soil sample was taken on 19 January 2017. **Please provide the mid-year samples required for establishing full compliance with the condition.**

---

29 The results of all samples taken under this consent shall be provided to the Canterbury Regional Council within ten (10) working days of receipt of the samples.

Compliance Report:
Unable to determine compliance

it was previously agreed that results will be provided on a monthly basis. Please ensure that you continue to provide these results, including records of wastewater application depths and hydraulic loading.

General comments

A site inspection and audit wastewater sampling was carried out on 26 October 2017. Monitoring officer Stephen Howard accompanied me on the site visit.

Odour was present on site. However, the odour was not detected beyond the property boundary. Audit sampling was carried out at a newly installed tap in the car park of the facility.

A detailed inspection of the treatment plant was not possible due to safety reasons. Parts of the plant are currently restricted as hydrogen sulphide ad ammonia levels are too high exiting the sludge drying areas. Fully fitted M3 masks and filters must be worn around the site. A full site inspection is planned in due course.

Currently, odour is generated from sludge being disturbed. Due to a treatment error earlier this year, the lower layers of the sludge have become anaerobic. Sludge is removed in truck loads (approx. 2 per day) from the site. Complete removal is expected within the next 2 months and the odour issues should resolve at this stage.

Date Inspected: 26 Oct 2017

Monitored By: Katie Nagy

Signature: _____

Resource Management Officer I Monitoring and Compliance - Selwyn, Waihora

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General information

Canterbury Regional Council Obligations

Under Section 35 of the Resource Management Act 1991, the Canterbury Regional Council has a duty to monitor all resource consent exercised within its region, to make sure all the conditions are being complied with.

Monitoring Frequency

The frequency with which your consent is monitored will vary according to the type of activity your consent authorises, the conditions imposed and the extent to which you have complied with these conditions on previous visits. **If you fully comply with all conditions then frequency will reduce to the minimum set for the activity.**

Costs

It is the Council's policy to recover all actual and reasonable costs of compliance monitoring of resource consents.

Environment Canterbury
Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

27 March 2017

Selwyn District Council
PO Box 90
Rolleston 7643

Dear Sir/Madam

Compliance Monitoring Report
Selwyn - Waihora Water Management Zone

Please find enclosed your compliance monitoring report for the following activity. It is important that you read this report carefully.

Consent number:	CRC153952
Location:	Burnham School Road, Main South Road & Brookside Road, ROLLESTON
Description:	To discharge contaminants to land and to air.

Overall consent compliance: **Complies**

Thank you for complying with the resource consent conditions that have been monitored.

If you continue to fully comply with all conditions then the frequency of monitoring will reduce to the minimum set for the activity.

If you would like any further information regarding this report please do not hesitate to contact me.

Yours sincerely

Maki Norman
Resource Management Officer II Monitoring and Compliance - Selwyn, Waihora

Doc No: C17C/49986
Your Customer No: EC118692
File No(s): CRC153952

Consent No: ***CRC153952***

Description of consent	**Commencement Date**
To discharge contaminants to land and to air.	06 Mar 2015
Location	**Expiry Date**
Burnham School Road, Main South Road & Brookside Road, ROLLESTON	17 Dec 2045

Conditions & compliance

1 The discharge shall be only:

a. Treated wastewater originating from the Pines Wastewater Treatment Facility located at Lot 1 DP 309881, Burnham School Road, Burnham as shown on Plan CRC153952A; and

b. Odour and aerosols associated with the spray irrigation of treated wastewater.

Compliance Report:

Complies

2 The discharge shall only occur within Wastewater Discharge Area A, B and C shown on Plan CRC153952B, and bound by Topo50 map references:

a. Topo50 BX23 459 672, BX23 472 699, BX23 467 708 and BX23 451 699; and

b. Topo50 BX23 453 700, BX23 472 710, BX23 468 717, BX23 454 710, BX23 455 709, BX23 449 716, BX23 450 705 and BX23 451 705.

c. The total combined volume of treated wastewater discharged under this consent and CRC131423 shall not exceed 25,614 cubic metres per day over the wastewater irrigation areas shown on Plan CRC153952B.

d. For the purposes of compliance with this condition the consent holder shall operate a flow meter which continuously monitors the volume of wastewater discharged to the irrigation area.

Compliance Report:

Complies

The discharge is via centre pivot irrigators within the consented discharge area.

3 The consent holder shall ensure that influent volumes of wastewater do not exceed the operating capacity of the treatment and irrigation systems.

Compliance Report:
Not monitored

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4 The consent holder shall ensure that:

a. The discharge receives ultra-violet disinfection prior to irrigation.

b. The median concentration of faecal coliforms in the discharge shall not exceed 500 faecal colony forming units per 100 millilitre sample.

c. An alarm is fitted to the ultra-violet disinfection system which activates in the event that an inadequate dose is applied.

The ultra-violet disinfection system is calibrated and serviced annually.

Compliance Report:
Complies

(b) Audit sampling of post UV wastewater was carried out on 14 March 2017. Samples were analysed by Hill Laboratories. The results show that the Faecal Coliforms count per 100ml was 160.

---

5 Alarm systems shall be installed at the treatment plant to warn of a power failure or a failure of any critical treatment system components. Standby power generation shall be available at all times the plant is operational.

Compliance Report:
Complies

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6 The discharge shall occur only via a spray irrigation system.

Compliance Report:
Complies

Wastewater is discharged via centre pivot irrigators.

---

7 The application depth of the discharge shall not exceed 64 millimetres over any consecutive five (5) day period, and no single application shall exceed a depth of 20 millimetres.

Compliance Report:
Complies

There were no signs to suggest that the maximum application depth had been exceeded at the time of my site visit.

---

9 a. Prior to irrigation, the discharge shall be treated to ensure the following standards are met:

Parameter	Median*	95th Percentile*
Biochemical Oxygen Demand (BOD)	15	60
Suspended Solids	20	90
Total Nitrogen	7	35
Faecal Coliforms (cfu/100ml)	500	1,000

*All values are expressed in grams per cubic metre except faecal coliforms which are expressed colony-forming units per 100 millilitre sample.

b. In order to demonstrate compliance with Condition 9(a), samples of wastewater shall be taken from the pump chamber and analysed at least monthly.

Compliance Report:
Not monitored

The audit sample results are as below.

BOD: <2 g/m^3
Total SS: 4 g/m^3
Total N: 5.4 g/m^3
Faecal Coliforms: 160 cfu/100ml

---

10 There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours.

Compliance Report:
Complies

There were no signs of effluent ponding in the discharge paddock at the time of this visit.

---

11 The discharge shall be managed to ensure that there shall be no discharge within 20 metres of any surface water body and the run-off of wastewater into any surface waterbody is prevented.

Compliance Report:
Complies

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17 The discharge shall be managed to ensure that:

a. Aerosols and spray-drift arising from the discharge do not cause offensive or objectionable effects beyond the boundary of the discharge area.

b. Any odour resulting from spray irrigation of wastewater shall not result in offensive or objectionable effects on the environment beyond the boundary of the irrigated area.

Compliance Report:
Complies

There were no issues associated with spray drift or odour beyond the property boundary at the time of my visit.

General comments

A site inspection and audit wastewater sampling was carried out on 14 March 2017.
No obvious issues were noted during my site visit.

If you have any queries regarding the monitoring of your consent please contact me on 0275370355 or email maki.norman@ecan.govt.nz. For all general enquiries please contact Customer Services on 0800 324 636.

Date Inspected: 14 Mar 2017

Monitored By: Maki Norman

Signature: _____

Resource Management Officer II Monitoring and Compliance - Selwyn, Waihora

General information

Canterbury Regional Council Obligations

Under Section 35 of the Resource Management Act 1991, the Canterbury Regional Council has a duty to monitor all resource consent exercised within its region, to make sure all the conditions are being complied with.

Monitoring Frequency

The frequency with which your consent is monitored will vary according to the type of activity your consent authorises, the conditions imposed and the extent to which you have complied with these conditions on previous visits. **If you fully comply with all conditions then frequency will reduce to the minimum set for the activity.**

Costs

It is the Council's policy to recover all actual and reasonable costs of compliance monitoring of resource consents.

From:	Amit Chauhan
To:	Trinity White
Cc:	Chris Salkeld
Subject:	FW: Odour complaint
Date:	Wednesday, 7 August 2019 4:21:39 PM
Attachments:	image001.png image002.jpg

Hi Trinity,

Thanks for your call this afternoon. Trailing mail FYI. We will do further checks and let you know if we find something.

Kind regards

Amit

From: Chris Salkeld [mailto:xxxxxx@xxxxx.xx.xx]
Sent: Wednesday, 7 August 2019 4:04 PM
To: Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx>
Cc: Darryl Collins <xxxxxx@xxxxx.xx.xx>
Subject: Odour complaint

HI Amit

I've checked with Stew – load out only started this afternoon. No sludge managers were operating this morning so it won't have been that.

Cheers

Chris Salkeld | Wastewater Supervisor
BSc Genetics, NZ Dip Wastewater

85 Hoskyns Road, IZONE
PO Box 125
Rolleston 7643
DDI: 03 347 2992
Cell: 027 702 7576
Email: xxxxxx@xxxxx.xx.xx
WEB: www.sicon.co.nz

Sicon Logo - email v2

2 Norman Kirk Drive, Rolleston 7614
PO Box 90, Rolleston 7643
Phone: (03) 347-2800 or (03) 318-8338
Fax: (03) 347-2799
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www.selwyn.getsready.net

From:	Trinity White
To:	Amit Chauhan
Subject:	CRC153952 Pines advice re location of new monitoring bore location
Date:	Tuesday, 11 February 2020 1:28:00 PM
Attachments:	FW CRC153952 The Pines.msg image001.jpg image002.png

---

Hello Amit,

I have just spoke with Fouad again regarding your request.

Fouad reminded me of his comments provided 12 November 2019 (attached) where he advised that the locations of the downgradient bores are not optimal and that a bore should be installed below the center pivot on the corner of Brookside and Burnham Road as per the below amended diagram.

I trust this answers your query.

Kind regards,

Trinity

From: Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx>
Sent: Monday, 3 February 2020 5:04 PM
To: Trinity White <xxxxxxx.xxxxx@xxxx.xxxx.xx>
Subject: New monitoring bore location -Pines

Hi Trinity,

Pursuant to our discussion on Pines Bores monitoring (Condition 25) , please find attached the map of the proposed location of the new bores.

Total four new downstream monitoring bores will be done.
Three downstream monitoring bores are proposed on the Brookside rd and one downstream monitoring bore to the south east of CP5 near Burnham school Rd.

Three Upstream bores will be used for monitoring.
BX23/0878 will stay as the upstream monitoring bore and we will develop two new bores as indicated in the map for upstream monitoring. Please let us know if that is O.K with you.

Kind regards

Amit

2 Norman Kirk Drive, Rolleston 7614
PO Box 90, Rolleston 7643
Phone: (03) 347-2800 or (03) 318-8338
Fax: (03) 347-2799
www.selwyn.govt.nz | www.selwynlibraries.co.nz
www.selwyn.getsready.net

From: Trinity White
To: Amit Chauhan
Subject: FW: CRC153952 The Pines
Date: Wednesday, 27 November 2019 10:37:00 AM

Hello Amit,

For your info. Please be aware Fouad's advice below refers to the locations rather than what will achieve compliance with the consent. All bores will still need to comply with the exact wording within the consent.

Happy to discuss further if you wish.

Kind regards,

Trinity

From: Fouad Alkhaier <xxxxx.xxxxxxxx@xxxx.xxxx.xx>
Sent: Tuesday, 12 November 2019 3:49 PM
To: Trinity White <xxxxxxx.xxxxx@xxxx.xxxx.xx>
Subject: RE: CRC153952 The Pines

Hello Trinity,

- The locations of the three upgradient bores are Ok.

I note that BX23/0878 has a long screen, they may want to keep it as one of the required monitoring bores if they demonstrate that the screen span meets the '2m below' and the '1m above' condition.

- The locations of the downgradient bores are not optimal: I think the locations of BX23/0208 and M36/7464 are Ok, then if they would add the third location downgradient of the big center pivot.

Again, I note that M36/7464 has a long screen and they may want to keep it as one of the required monitoring bores if they demonstrate that the screen span meets the '2m below' and the '1m above' condition.

Cheers
Fouad

From: Trinity White <xxxxxxx.xxxxx@xxxx.xxxx.xx >
Sent: Tuesday, November 5, 2019 9:38 AM
To: Fouad Alkhaier <xxxxx.xxxxxxxx@xxxx.xxxx.xx >
Cc: Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx >
Subject: CRC153952 The Pines

Good morning Fouad,

I hope you are well? Do you remember when we met SDC in Rolleston to discuss the depth of their monitoring bores?

SDC are about to drill new bores to achieve compliance with their consent, and would like your feedback with regards to locations.

For your information, their consent requires SDC to:
Establish a minimum of 3 onsite monitoring bores located down gradient of the irrigation and 2 onsite monitoring bores located upgradient of the irrigation area.
The bores must have screened sections extending from two (2) metres below the lowest water level to one (1) metre above the highest water level.

I have attached a map showing the current bore locations for your info. The depth the current bores are screen are as follows:
Upgradient
BX23/0204 = 22.5m (screened 18m - 21m)
BX23/0205 = 24m (screened 21m - 24m)
BX23/0878 = 18m (screened 6m - 18m)

Downgradient
BX23/0206 = 13.9m (screened 8.9m - 13.9m)
BX23/0207 = 14m (screened 9m - 12m)
M36/7464 = 16.5m (screened 7.5m to 16.5m)
BX23/0208 = 17m (screened 11m to 14m)

Kind regards,

Trinity

Trinity White
Senior RMO - Compliance Monitoring - Selwyn Waihora Zone Delivery

From:	Amit Chauhan
To:	Katie Nagy
Cc:	Ken Winsloe-Sicon; Chris Salkeld; Cinnil Thomas
Subject:	RE: Follow-up site visit 26/10/2017
Date:	Thursday, 26 October 2017 4:06:13 PM
Attachments:	PINES IRRIGATERS.png TEST RESULT MONITORING- ECAN 20-10-17.xlsx 201710261550.pdf

---

Hi Katie,

Thank you for visiting the plant. It was pleasure to meet and interact with you guys this morning.

The residents around the pines have our contact details and are encouraged to ring us when they come across any odour. I am in touch with residents of 966 Selwyn Rd and 119 Burnham school rd., who have brought the odour issues to our notice couple of times this month with one of them reported last weekend. We are working with them and appreciate your help on that.

The copies of sampling results, summary of results & the irrigator map is attached for your reference. Please let me know in case you need more details.

Thank you again and look forward to your next visit.

Kind regards

Amit

From: Katie Nagy [mailto:xxxxx.xxxx@xxxx.xxxx.xx]
Sent: Thursday, 26 October 2017 12:49 p.m.
To: Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx>; Ken Winsloe-Sicon <ken@sicon.co.nz>; Chris Salkeld <xxxxxx@xxxxx.xx.xx>
Subject: Follow-up site visit 26/10/2017

Hi Amit, Ken and Chris,

Thank you again for clearing your schedules to meet us on site today. It was a great opportunity to meet everyone involved in the management of the plant and the upgrade.

As I mentioned on site, I am following up the odour complaints that we have received over the last 4 weeks. Understanding the issues on site and the progress towards resolution will give good reassurance to the complainants and I am confident that the number of complaints will reduce as a result of that. Could you please provide a copy of your complaint register from July to now so that I can compare the complaints coming through our pollution hotline with yours? They may come from the same neighbours, in which case I can disclose the personal detail to you (with their permission of course). I'll make sure to notify you in future should we receive any further odour complaints.

I haven't been able to find copies of the monthly sampling results saved under your consents. Could you please forward an electronic copy of the last few sampling rounds? I will provide a copy of the Hill Labs report to you once I receive the results of this sampling round, along with a

report summarising today's visit.

I also tried to find a map identifying the pivots and sectors in your discharge area in our database but had no luck. Could you please forward a map with the location of the irrigators and sectors (incl. exclusion sectors and buffer zones) for our records?

Please feel free to get in touch with me any time and I look forward to a full site induction in the future.

Kind regards,
Katie

Katie Nagy
Resource Management Officer I Monitoring and Compliance - Selwyn, Waihora
Environment Canterbury

027 205 6791
xxxxx.xxxx@xxxx.xxxx.xx

PO Box 345, Christchurch 8140
Customer Services: 0800 324 636
Pollution Hotline: 0800 76 55 88

Facilitating sustainable development in the Canterbury region ecan.govt.nz

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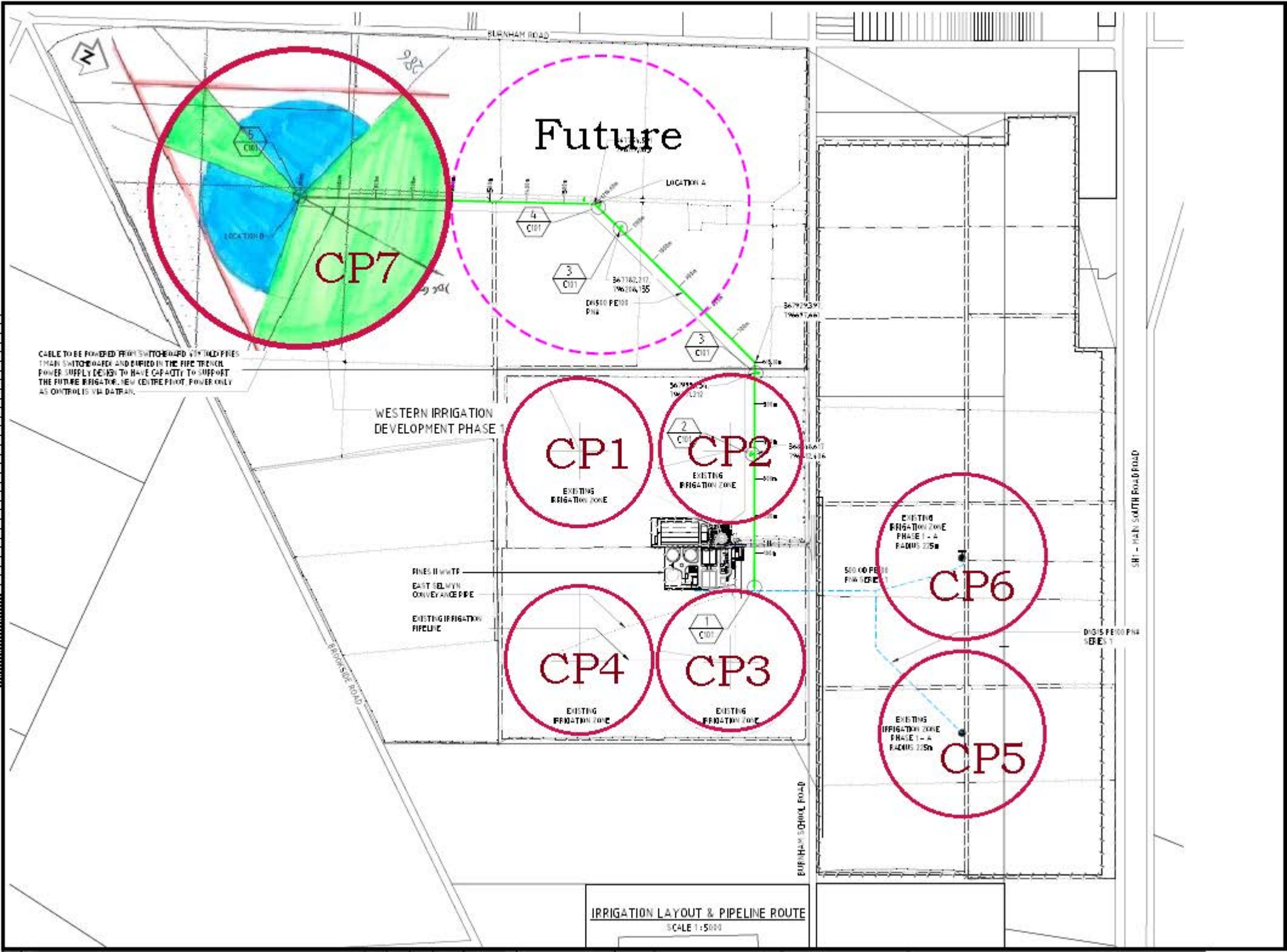
BURNHAM ROAD
Future
CP7
LOCATION A
LOCATION B
CABLE TO BE POWERED FROM SWITCHBOARD AT FIELD PINES
MAIN SWITCHBOARD AND BURIED IN THE PIPE TRENCH.
POWER SUPPLY DESIGN TO HAVE CAPACITY TO SUPPORT
THE FUTURE IRRIGATOR. NEW CENTRE PIVOT, POWER ONLY
AS CONTROL IS VIA DATRAN.
WESTERN IRRIGATION
DEVELOPMENT PHASE 1
CP1
EXISTING
IRRIGATION ZONE
CP2
EXISTING
IRRIGATION ZONE
FINES II WWTP
EAST SELWYN
CONVEYANCE PIPE
EXISTING IRRIGATION
PIPELINE
CP4
EXISTING
IRRIGATION ZONE
CP3
EXISTING
IRRIGATION ZONE
BROOMSIDE ROAD
BURNHAM SCHOOL ROAD
EXISTING
IRRIGATION ZONE
PHASE 1 - 4
RADIUS 225m
CP6
EXISTING
IRRIGATION ZONE
PHASE 1 - 4
RADIUS 225m
CP5
SH1 - MAIN SOUTH ROAD
IRRIGATION LAYOUT & PIPELINE ROUTE
SCALE 1:5000

Monitoring Well No.	Location	Well Depth in M	Lab no:1531670		Lab no:1530868		Lab no: 1540668		Lab 1548700		Lab No: 1583845		Lab No: 1583843		Lab No : 1602366		Lab No : 1602360	
			4-Feb-14		10-Feb-14		20-Mar-14		21-Apr-14		13-May-14		13-May-14		29-Jun-14		29-Jun-14	
			mg/l	% greater than optimum	mg/l	% greater than optimum	mg/l	% greater than optimum	mg/l	% greater than optimum	mg/l	% greater than optimum	mg/l	% greater than optimum	mg/l	% greater than optimum	mg/l	% greater than optimum
MSK/7422	Downstream		6.7												2.4		1.01	
MSK/7422	Downstream														1.03		1.02	
BKZ1/0264	Upstream	22.5	5.5		6		6.4		5.5		5.3		5.5		5		4.9	
BKZ1/0305	Upstream	24	9.1		9.3		9		8.7		7.5		7.4		8.7		7.8	
	Upstream average value		**7.1**		**7.85**		**7.7**		**7.1**		**6.4**		**6.45**		**6.85**		**6.35**	
MSK/7847	Downstream		2.2	10.22	2.4	18.33	2.8	43.33	2.6	30.28	1.7	76.24	1.75	74.83	1.11	107.83	1.11	107.97
MSK/7848	Downstream		1.67	70.73	1.92	74.00					1.88	77.54	1.47	77.89	0.98	87.43	0.89	90.14
BKZ1/0290	Downstream	13.5	9.8	39.7	9.9	37.5	8.6	57.7	8.3	57.7	8.4	57.5	8.4	57.5	14.1	148.4	14.3	146.7
BKZ1/0307	Downstream	18	4.6	38.7	5.2	32.0	5	35.1	4.7	35.0	4.7	38.3	4.6	35.1	9.8	45.5	9.7	44.8
MSK/0415	Downstream		5.6	25.2	6.1	20.1	7.5	7.2	7.1	7.7	6.8	6.5	6.9	7.2	4.4	30.3	4.5	29.13
MSK/0416	Downstream		1.2	57.5	2.9	42.1	2.3	39.1	1.9	38.2	2.1	48.2	2	43.9	1.66	38.7	1.65	37.01
MSK/7444	Downstream	16.5	6.2	17.3	5.8	26.2	6	22.1	6.6	9.6	5.5	16.7	5.4	16.8	13.8	89.3	15	106.7
BKZ1/0308	Downstream	17	3.2	57.3	4.8	37.3	5.6	27.3	5.3	27.6	5.1	22.7	5.1	23.1	3.6	47.4	3.7	41.7

Monitoring Well No.	Location	Lab No : 1611887	Lab No : 1611867	Lab No : 1611846	PINES PLANT LAB	Lab no : 1631054	PINES PLANT LAB	Lab no : 1631976	PINES PLANT LAB	Lab no : 1631918	PINES PLANT LAB	Lab no : 1629250	Lab no : 1624220	Lab No : 1629721	Lab No : 1633393	Lab No : 1633392	Lab No : 1638457	Lab No : 1638345	Lab No : 1641905
		5-Jul-14	7-Jul-14	11-Jul-14	Sample @ 15 July 2014	23-Jul-14	Sample @ 23 July 2014	25-Jul-14	Sample @ 25 July 2014	25-Jul-14	Sample @ 25 July 2014	28-Jul-14	1-Aug-14	11-Aug-14	18-Aug-14	18-Aug-14	24-Aug-14	27-Aug-14	2-Sep-14
		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	Nitrate mg/l	Nitrate mg/l	mg/l
MSK/7422	Downstream											6.7			6.7	6.1			6.8
MSK/7422	Downstream											1.07			1.07	1.07			1.03
BKZ1/0264	Upstream		6.2			6.1	7.3			5.9					6.1	7.3			5.9
BKZ1/0305	Upstream		7.3			8.2	8.1			8.6					8.2	8.1			8.6
	Upstream average value		**6.75**			**7.15**	**7.7**			**7.2**					**7.15**	**7.7**			**7.2**
MSK/7847	Downstream		1.18			1.15	1.17			1.1					1.15	1.17			1.1
MSK/7848	Downstream		1.11			0.85	0.85			0.94					0.85	0.85			0.94
BKZ1/0290	Downstream		16	13.1	13.2	9.8	10.6	20	15.9	16.2	16.7	16	16.8	17.7	9.8	10.6	20	15.9	16.2
BKZ1/0307	Downstream		6.6			4	4.5			5.8					4	4.5			5.8
MSK/0415	Downstream		4.8			3.5	4.7			4.4					3.5	4.7			4.4
MSK/0416	Downstream		1.74			2	2.1			2.1					2	2.1			2.1
MSK/7444	Downstream		9.2	7.5	7.4	7.9	7.6		6.4	6.4					7.9	7.6		6.4	6.4
BKZ1/0308	Downstream		4.5			4.2	4			4.7					4.2	4			4.7

Monitoring Well No.	Location	Lab no : 1631918	Lab No : 1647478	Lab No : 1647480	Lab No : 1655995	Lab no : 1659941-2	Lab no : 1659942	Lab No : 1664277	Lab No : 1668648	Lab No : 1669370	Lab No : 1674936	Lab No : 1677737	Lab No : 1681142	Lab No : 1685031	Lab No : 1687429	Lab No : 1692358	Lab No : 1698100	Lab No : 1698180	Lab No : 1702585
		2-Sep-14	5-Sep-14	19-Sep-14	30-Sep-14	28-Sep-14	5-Oct-14	5-Oct-14	14-Oct-14	25-Oct-14	3-Nov-14	3-Nov-14	10-Nov-14	10-Nov-14	19-Nov-14	4-Dec-14	15-Dec-14	15-Dec-14	15-Dec-14
		Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l
MSK/7422	Downstream																		
MSK/7422	Downstream																		
BKZ1/0264	Upstream								5.1				5.1					0.6	
BKZ1/0305	Upstream								8.7				8.2					8.7	
	Upstream average value								**6.9**				**7.15**					**7.65**	
MSK/7847	Downstream								1.1				1.1					1.1	
MSK/7848	Downstream								0.79				0.79					1.35	
BKZ1/0290	Downstream	16.2	16	16.7	16	16.8	16.7	16	16.7	16.2	16.3	16	16.7	16.9	16.8	16.8	16.3	16.5	16.6
BKZ1/0307	Downstream								5.8				5.5					5.8	
MSK/0415	Downstream								4.4				4.6					4.9	
MSK/0416	Downstream								2.1				1.97					2.1	
MSK/7444	Downstream								7.1				7.1					7.1	
BKZ1/0308	Downstream								4.6				4.9					5.2	

Monitoring Well No.	Location	Lab No : 1698048	Lab No : 1698970	Lab No : 1674936	Lab No : 1677737	Lab No : 1681142	Lab No : 1685031	Lab No : 1687429	Lab No : 1692358	Lab No : 1698100	Lab No : 1698180	Lab No : 1702585	Lab No : 1703704	Lab No : 1708684	Lab No : 1714268	FEB 17 week 1	FEB 17 week 2	FEB 17 week 3	Labno: 1728953
		25-Oct-14	25-Oct-14	3-Nov-14	3-Nov-14	10-Nov-14	19-Nov-14	19-Nov-14	4-Dec-14	15-Dec-14	15-Dec-14	15-Dec-14	4-Jan-15	17-Jan-15	26-Jan-15				23-Feb-17
		mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l
MSK/7422	Downstream																		
MSK/7422	Downstream																		
BKZ1/0264	Upstream	5.1				5.1						0.6			6.5				7
BKZ1/0305	Upstream	8.2				8.2						8.7			8.2				8.5
	Upstream average value	**6.8**				**7.15**						**7.65**			**7.7**				**7.8**
MSK/7847	Downstream	1.1				1.1						1.1			1.1				1.05
MSK/7848	Downstream	0.79				0.79						1.35			1.1				1.05
BKZ1/0290	Downstream	16.7	16	16.8	16.7	16.9	16.8	16.8	16.3	16.5	16.6	16	16	16	16.7	NW	NW	NW	NW
BKZ1/0307	Downstream	5.8				5.5						5.8			4.5				NW
MSK/0415	Downstream	4.4				4.6						4.9			4.1				4.1
MSK/0416	Downstream	2.1				1.97						2.1			1.84				
MSK/7444	Downstream	7.1				7.1						7.1			5.7				7.1
BKZ1/0308	Downstream	4.6				4.9						5.2			4.3				

Monitoring Well No.	Location	Labno: 1731869	Labno: 1731868	Labno: 1739184	Labno: 1761673-reported on 4th may	Labno: 1772288	Labno: 1777692	Labno: 1781787	Labno: 1781788	Labno: 1785042	Lab No: 1788456	Lab No: 1793945	Lab No: 1796068	Lab no: 1807758	Lab no: 1831168	Lab no: 1831169	Lab no: 1857209	Lab no: 1862266
		23-Feb-17	23-Feb-17	24-Mar-17	24-Apr-17	9-May-17	18-May-17	25-Mar-17	25-Mar-17	31-Mar-17	2-Jun-17	14-Jun-17	21-Jun-17	12-Jul-17	28-Aug-17	20-Sep-17	3-Oct-17	19-Oct-17
		Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l	Nitrate mg/l
MSK/7422	Downstream				4.9			2.1	2.2					1.9	1.9	2.1		
MSK/7422	Downstream				1.02			1.01	1.02					1.1	1.09	1.1		
BKZ1/0264	Upstream	7	6.8	6.9	5.2			7.2	7.2					6.3	6.1	2.1	0.006	
BKZ1/0305	Upstream	8.5	8.5	8.5	8.6	8.5	8.4	7.2	7.2	7.5	7.4	7.8	7.3	6.4	5.1	4.6	4.9	8.8
	Upstream average value			**8.1**	**6.9**			**7.2**	**7.2**					**6.75**	**6.15**	**3.7**	**2.303**	
MSK/7847	Downstream	1.05	1.05	1.1	0.91			0.93	0.93					1.14	0.79	1.1	0.03	
MSK/7848	Downstream				1.1			1.07	1.07					1.06	0.79	1.1	0.47	
BKZ1/0290	Downstream	16.8	16.8	16.3	16.8	NW	NW	16.4	17.4	NW	NW	NW	8.7	7.1	5.9	7.1		8.7
BKZ1/0307	Downstream	NW	NW	NW	10.9	6.7	5.8	3.8	4	3.8	3.4	3.8	3.8	3.8	5.1	5.8	7.8	1.18
MSK/0415	Downstream	4.1	4.1	4.1	3.9			2.9	2.9					1.9	3	3.5	4	
MSK/0416	Downstream			1.1	1.6			2.1	2.1					1.6	2.1	2	2.1	
MSK/7444	Downstream	7.1	7	6.5	13.1	10.6	10.3	13.3	14.2	12.8	9.5	11.1	11.1	10.3	5.5	3.7	6.4	6.7
BKZ1/0308	Downstream				5.2			3.3	3.4					4.9	5.2	7	0.002	3.102

1- Nitrate level >11.3 mg/l

2- Nitrate level greater than 8 mg/l & greater than 30% of the upstream Nitrate value

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ANALYSIS REPORT

Client:	Selwyn District Council	**Lab No:**	1807708 SPv1
Contact:	Lisa Shaw	**Date Received:**	12-Jul-2017
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	17-Jul-2017
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	Pines Bores - Monthly
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		M36/7462 12-Jul-2017 9:12 am	M36/7463 12-Jul-2017 9:30 am	M36/7464 12-Jul-2017 10:22 am	M36/7667 12-Jul-2017 9:20 am	M36/7668 12-Jul-2017 9:25 am
Lab Number:		1807708.1	1807708.2	1807708.3	1807708.4	1807708.5
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Nitrate-N	g/m³	4.1	1.98	10.4	0.94	0.95
Nitrate-N + Nitrite-N	g/m³	4.1	1.98	10.4	0.94	0.95
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1

Sample Name:		M36/20415 12-Jul-2017 9:45 am	M36/20416 12-Jul-2017 9:37 am	BX23/0204 12-Jul-2017 8:50 am	BX23/0205 12-Jul-2017 8:40 am	BX23/0207 12-Jul-2017 10:18 am
Lab Number:		1807708.6	1807708.7	1807708.8	1807708.9	1807708.10
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	0.31	0.36	0.163
Nitrate-N	g/m³	4.0	2.4	6.1	6.2	3.8
Nitrate-N + Nitrite-N	g/m³	4.0	2.4	6.4	6.6	4.0
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1

Sample Name:		BX23/0208 12-Jul-2017 10:30 am	BX23/0206 12-Jul-2017 10:10 am			
Lab Number:		1807708.11	1807708.12			
Individual Tests						
Nitrite-N	g/m³	0.163	< 0.10	-	-	-
Nitrate-N	g/m³	5.2	9.1	-	-	-
Nitrate-N + Nitrite-N	g/m³	5.3	9.1	-	-	-
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	-	-	-
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #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.

Sample Type: Aqueous

Test	Method Description	Default Detection Limit	Sample No

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ANALYSIS REPORT

Client:	Selwyn District Council	**Lab No:**	1831168 SPv1
Contact:	Lisa Shaw	**Date Received:**	24-Aug-2017
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	29-Aug-2017
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	Pines Bores - Monthly
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		M36/7461 24-Aug-2017 9:15 am	M36/7462 24-Aug-2017 10:30 am	M36/7463 24-Aug-2017 10:02 am	M36/7464 24-Aug-2017 11:05 am	M36/7667 24-Aug-2017 9:45 am
Lab Number:		1831168.1	1831168.2	1831168.3	1831168.4	1831168.5
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	0.002	< 0.002	< 0.002
Nitrate-N	g/m³	1.06	2.9	2.8	5.5	3.5
Nitrate-N + Nitrite-N	g/m³	1.06	2.9	2.8	5.5	3.5
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	2 #1	< 1 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	2 #1	< 1 #1	< 1 #1	< 1 #1

Sample Name:		M36/7668 24-Aug-2017 9:53 am	M36/20415 24-Aug-2017 10:20 am	M36/20416 24-Aug-2017 10:10 am	BX23/0204 24-Aug-2017 9:05 am	BX23/0205 24-Aug-2017 8:50 am
Lab Number:		1831168.6	1831168.7	1831168.8	1831168.9	1831168.10
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	0.58	< 0.002
Nitrate-N	g/m³	3.5	3.9	2.0	2.3	5.1
Nitrate-N + Nitrite-N	g/m³	3.5	3.9	2.0	2.8	5.1
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1

Sample Name:		BX23/0207 24-Aug-2017 10:55 am	BX23/0208 24-Aug-2017 11:15 am	BX23/0206 24-Aug-2017 10:45 am		
Lab Number:		1831168.11	1831168.12	1831168.13		
Individual Tests						
Nitrite-N	g/m³	1.08	2.3	< 0.10	-	-
Nitrate-N	g/m³	8.9	7.0	5.9	-	-
Nitrate-N + Nitrite-N	g/m³	10.0	9.3	5.9	-	-
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	1 #1	< 1 #1	-	-
Escherichia coli	cfu / 100mL	< 1 #1	1 #1	< 1 #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.

Sample Type: Aqueous

Test	Method Description	Default Detection Limit	Sample No

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ANALYSIS REPORT

Client:	Selwyn District Council	**Lab No:**	1857209 SPv1
Contact:	Lisa Shaw	**Date Received:**	09-Oct-2017
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	16-Oct-2017
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	EWS - Pines Bores Nitrates- Monthly
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		11805 BX23/0205 09-Oct-2017 7:10 am	11806 BX23/0207 09-Oct-2017 7:57 am	11807 M36/7464 09-Oct-2017 8:02 am		
Lab Number:		1857209.1	1857209.2	1857209.3		
Nitrite-N	g/m^3	0.155	4.7	< 0.002	-	-
Nitrate-N	g/m^3	4.9	2.6	4.4	-	-
Nitrate-N + Nitrite-N	g/m^3	5.0	7.3	4.4	-	-

SUMMARY OF METHODS

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

Sample Type: 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
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m^3	1-3
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m^3	1-3
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m^3	1-3

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

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

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Ara Heron BSc (Tech)
Client Services Manager - Environmental

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ANALYSIS REPORT

Client:	Selwyn District Council	**Lab No:**	1846330 SPv1
Contact:	Lisa Shaw	**Date Received:**	20-Sep-2017
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	28-Sep-2017
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	Pines Bores - Monthly
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		M36/7461 20-Sep-2017 9:15 am	M36/7462 20-Sep-2017 10:08 am	M36/7463 20-Sep-2017 9:47 am	M36/7464 20-Sep-2017 10:38 am	M36/7667 20-Sep-2017 9:36 am
Lab Number:		1846330.1	1846330.2	1846330.3	1846330.4	1846330.5
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Nitrate-N	g/m³	2.2	2.8	0.45	3.7	0.69
Nitrate-N + Nitrite-N	g/m³	2.2	2.8	0.45	3.7	0.69
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1

Sample Name:		M36/7668 20-Sep-2017 9:43 am	M36/20415 20-Sep-2017 10:03 am	M36/20416 20-Sep-2017 9:57 am	BX23/0204 20-Sep-2017 9:05 am	BX23/0205 20-Sep-2017 8:55 am
Lab Number:		1846330.6	1846330.7	1846330.8	1846330.9	1846330.10
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	0.72	0.23
Nitrate-N	g/m³	0.47	4.0	3.1	0.006	4.6
Nitrate-N + Nitrite-N	g/m³	0.47	4.0	3.1	0.72	4.8
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1

Sample Name:		BX23/0207 20-Sep-2017 10:32 am	BX23/0208 20-Sep-2017 10:42 am	BX23/0206 20-Sep-2017 10:27 am		
Lab Number:		1846330.11	1846330.12	1846330.13		
Individual Tests						
Nitrite-N	g/m³	2.1	0.010	< 0.10	-	-
Nitrate-N	g/m³	5.8	< 0.002	9.5	-	-
Nitrate-N + Nitrite-N	g/m³	7.9	0.010	9.5	-	-
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	-	-
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #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.

Sample Type: Aqueous

Test	Method Description	Default Detection Limit	Sample No

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ANALYSIS REPORT

Client:	Selwyn District Council	**Lab No:**	1862296 SPv1
Contact:	Lisa Shaw	**Date Received:**	18-Oct-2017
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	25-Oct-2017
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	Pines Bores - Monthly
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		M36/7461 18-Oct-2017 10:30 am	M36/7462 18-Oct-2017 11:30 am	M36/7463 18-Oct-2017 10:50 am	M36/7464 18-Oct-2017 11:55 am	M36/7667 18-Oct-2017 11:02 am
Lab Number:		1862296.1	1862296.2	1862296.3	1862296.4	1862296.5
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Nitrate-N	g/m³	2.3	3.3	1.84	4.7	4.6
Nitrate-N + Nitrite-N	g/m³	2.3	3.3	1.84	4.7	4.6
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1

Sample Name:		M36/7668 18-Oct-2017 10:55 am	M36/20415 18-Oct-2017 11:10 am	M36/20416 18-Oct-2017 11:15 am	BX23/0204 18-Oct-2017 10:30 am	BX23/0205 18-Oct-2017 10:20 am
Lab Number:		1862296.6	1862296.7	1862296.8	1862296.9	1862296.10
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	0.097	0.23
Nitrate-N	g/m³	0.62	2.7	2.1	0.017	4.4
Nitrate-N + Nitrite-N	g/m³	0.63	2.7	2.1	0.113	4.6
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	3 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	3 #1	< 1 #1	< 1 #1

Sample Name:		BX23/0207 18-Oct-2017 11:48 am	BX23/0208 18-Oct-2017 12:00 pm	BX23/0206 18-Oct-2017 11:40 am		
Lab Number:		1862296.11	1862296.12	1862296.13		
Individual Tests						
Nitrite-N	g/m³	5.1	0.007 #2	< 0.10	-	-
Nitrate-N	g/m³	1.14	< 0.002	4.7	-	-
Nitrate-N + Nitrite-N	g/m³	6.2	< 0.002 #2	4.7	-	-
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	-	-
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	-	-

Analyst's Comments

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

#2 It has been noted that the result for Nitrite-N was greater than that for Nitrate-N + Nitrite-N, but within the analytical variation of these methods.

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Environment Canterbury
Regional Council
Kaunihera Taiao ki Waitaha

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30 August 2018

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PO Box 90
Rolleston 7643

Dear Sir/Madam

Compliance Monitoring Report
Selwyn - Waihora Water Management Zone

Please find enclosed your compliance monitoring report for the following activity. It is important that you read this report carefully.

Consent number:	CRC153952
Location:	Burnham School Road, Main South Road & Brookside Road, ROLLESTON
Description:	To discharge contaminants to land and to air.

Overall consent compliance: **Non-compliance Action required**

This matter needs your immediate attention.

Reason(s) for non-compliance:

The discharge exceeded the monthly average hydraulic loading rate of 8mm per day on 6 occasions, please ensure this does not occur again, compliance with this condition will be reassessed in December 2018 during the end of year compliance check.

Please contact me on 027 578 0947 to discuss the actions needed to achieve compliance.

Yours sincerely

Trinity White
Resource Management Officer II Monitoring and Compliance

Consent No: ***CRC153952***

Description of consent	**Commencement Date**
To discharge contaminants to land and to air.	06 Mar 2015
Location	**Expiry Date**
Burnham School Road, Main South Road & Brookside Road, ROLLESTON	17 Dec 2045

Conditions & compliance

1 The discharge shall be only:

a. Treated wastewater originating from the Pines Wastewater Treatment Facility located at Lot 1 DP 309881, Burnham School Road, Burnham as shown on Plan CRC153952A; and

b. Odour and aerosols associated with the spray irrigation of treated wastewater.

Compliance Report:

Complies

At the time of my visit discharges were only treated wastewater from the Pines WWTP and odour/aerosols associated with the spray irrigation of the treated wastewater.

2 The discharge shall only occur within Wastewater Discharge Area A, B and C shown on Plan CRC153952B, and bound by Topo50 map references:

a. Topo50 BX23 459 672, BX23 472 699, BX23 467 708 and BX23 451 699; and

b. Topo50 BX23 453 700, BX23 472 710, BX23 468 717, BX23 454 710, BX23 455 709, BX23 449 716, BX23 450 705 and BX23 451 705.

c. The total combined volume of treated wastewater discharged under this consent and CRC131423 shall not exceed 25,614 cubic metres per day over the wastewater irrigation areas shown on Plan CRC153952B.

d. For the purposes of compliance with this condition the consent holder shall operate a flow meter which continuously monitors the volume of wastewater discharged to the irrigation area.

Compliance Report:

Complies

Discharge is via centre pivot. The pivots have been installed within the areas stated in Condition 2(a) and 2(b). The largest combined daily discharge volume from the seven irrigators during the review period was 10,875 m3/day in January 2018, this is determined by flow meter.

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3 The consent holder shall ensure that influent volumes of wastewater do not exceed the operating capacity of the treatment and irrigation systems.

Compliance Report:
Not monitored

Expansion of the plant to cope with a predicted increase in population is underway.

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4 The consent holder shall ensure that:

a. The discharge receives ultra-violet disinfection prior to irrigation.

b. The median concentration of faecal coliforms in the discharge shall not exceed 500 faecal colony forming units per 100 millilitre sample.

c. An alarm is fitted to the ultra-violet disinfection system which activates in the event that an inadequate dose is applied.

The ultra-violet disinfection system is calibrated and serviced annually.

Compliance Report:
Complies

All effluent is UV treated prior to discharge. The audit sample taken during my site visit reported 50 CFU/100ml. It is my understanding that the system is fitted with an alarm and that it is calibrated and serviced annually.

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5 Alarm systems shall be installed at the treatment plant to warn of a power failure or a failure of any critical treatment system components. Standby power generation shall be available at all times the plant is operational.

Compliance Report:
Complies

During my visit I was informed by the plant manager Chris that a number of alarms are installed to warn of power failure. These alarms are linked to various employees who are alerted in the event of power and/or equipment failure. A standby generator is available.

6 The discharge shall occur only via a spray irrigation system.

Compliance Report:
Complies

Treated wastewater is discharged via centre pivots.

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7 The application depth of the discharge shall not exceed 64 millimetres over any consecutive five (5) day period, and no single application shall exceed a depth of 20 millimetres.

Compliance Report:
Complies

Appendix C of the Annual Report shows that the application depth of any discharge did not exceed a 20mm at any one time or 64 mm over any consecutive five day period.

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8 The discharge shall not exceed a monthly average hydraulic loading rate of eight (8) millimetres per day.

Compliance Report:
Non-compliance Action required

The discharge exceeded the monthly average hydraulic loading rate of 8mm per day on 6 occasions:
July 17 - CP7 = 8.36mm
Sept 17 - CP1 = 9.16mm
Oct 17 - CP4 = 8.30mm
Jan 18 - CP6 = 8.58mm
Apr 18 - CP1 = 9.01mm
Apr 18 CP2 = 8.90mm

The following explanation was offered in the Annual Report "This was a period of intense construction activities around the Plant to install new bioreactors. To accommodate the construction activities, some pivots were taken out of service from time to time which resulted in minor exceedances in monthly average discharge. The exceedance in September 2017 under Pivot 1 was due CP4 being out of service from the 28th of August to the 17th of September 2017 while repairs where being carried out. The exceedance in April was due to (i) CP4 being out of service from the 10th of March to the 15th of April 2018, (ii) CP5 being out of service from 17-26 April, (iii) CP6 being out of service from 20-26 April 2018 and (iv) CP7 being out of service from 23 March – 22 April 2018. Several (5) smaller exceedances (8-9 mm/day) were also noted and these were attributable some pivots not being available for short periods of time."

Further to this it is suggested that now construction at the pines is nearing completion and an additional irrigation area will be available to help lower the hydraulic loading that it is not expected to be an issue in future.

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9 a. Prior to irrigation, the discharge shall be treated to ensure the following standards are met:

Parameter	Median*	95th Percentile*
Biochemical Oxygen Demand (BOD)	15	60
Suspended Solids	20	90
Total Nitrogen	7	35
Faecal Coliforms (cfu/100ml)	500	1,000

*All values are expressed in grams per cubic metre except faecal coliforms which are expressed colony-forming units per 100 millilitre sample.

b. In order to demonstrate compliance with Condition 9(a), samples of wastewater shall be taken from the pump chamber and analysed at least monthly.

Compliance Report:
Complies

SDC has provided the median and 95th percentile values for the above measures for this reporting year. All of the values are within the consent limits.

The sample results taken during my site visit were
Total Suspended Solids = 12g/m3
Total Nitrogen = 9.3g/m3
Nitrate-N + Nitrite-N = 5.2g/m3
Total Kjeldahl Nitrogen = 4.1g/m3
Total Phosphorous = 1.80g/m3
Total Biochemical Oxygen Demand g O2/m3 = 13
Faecal Coliforms 50 cfu/100ml

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10 There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours.

Compliance Report:
Complies

At the time of my visit there was no ponding evident in the discharge paddocks.

11 The discharge shall be managed to ensure that there shall be no discharge within 20 metres of any surface water body and the run-off of wastewater into any surface waterbody is prevented.

Compliance Report:
Complies

There are no waterways within 20m of the discharge area.

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12 All stock water races within the wastewater irrigation areas shown on Plan CRC153952D shall be piped or otherwise closed by 28 February 2017.

Compliance Report:
Unable to determine compliance

The stock water race running through the centre of the discharge area has been closed. One stock water race remains adjacent to the discharge are covered by CP5. A buffer of greater than 20m is currently in place, furthermore there is a boundary hedge between the discharge area and the stock water race. The race is just within the area on Plan CRC153952D but outside of the 'wastewater irrigation area' as defined by Plan CRC153952B. After discussing this with a senior officer, I suggest that the race may remain, providing there continues to be a buffer of at least 20m and the boundary shelterbelt remains and is well maintained to ensure no spray drift enters the race.

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13 The discharge of treated wastewater shall only occur within the area labelled “Discharge Area A, B and C” on Plan CRC153952B according to the following setback distances:

a. Discharge Area A” no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *“Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land” or its successor, with wastewater spray irrigation set back by:*

   i. *No less than 40 metres from any site boundary where complying shelter is established*; or*

   ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.*

b. Within “Discharge Area B” no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *“Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land” or its successor, with wastewater spray irrigation set back by:*

   i. *No less than 15 metres from any site boundary where complying shelter is established*; or*

   ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.*

c. Within “Discharge Area C” no wastewater spray irrigation shall commence within 10 metres of any site boundaries.

Compliance Report:

Complies

Most shelterbelt trees are now over 3m and well established. The setback distances specified are being complied with.

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14 a. The consent holder shall undertake shelter planting as necessary to ensure that the effects of spray and aerosols from wastewater irrigation are not offensive or objectionable beyond the site boundary.* Note Wastewater spray irrigation is also precluded from occurring on Pt Lot 2 DP 82068 (as per the conditions of the designation)

b. Effluent shall not be applied:

   i. Onto land within 50 metres of any active community used for water extraction not owned by the holder of this consent and any community supply protection zones;

   ii. Onto land within 20 metres of any surface waterway;

   iii. Onto ground with no vegetative cover;

   iv. Onto ground where surface ponding is occurring; and

   v. There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours.

c. The consent holder shall prepare a Landscape Plan and shall provide it to the Canterbury Regional Council, Attn: RMA Compliance and Enforcement Manager prior to the commencement of planting confirming that the planting is consistent with the requirements of the Department of Public Health Public Health Services 1992 Guideline or its successor. The Landscape Plan shall include, but not be limited to, the following information:

   i. The location and extent of each area of shelter planting.

   ii. The species to be planted and the anticipated height of each plant following establishment.

   iii. The minimum plant size and spacing required at planting to achieve the minimum plant height defined in clause (b) of this condition prior to the commencement of wastewater spray irrigation.

d. Once established the landscaping shall be maintained for the duration of the exercise of the consent, with any dead, dying or diseased plants being replaced within one growing season within plants of a similar species and in accordance with the planting specified in the Landscape Plan required under clause (c).

Compliance Report:
Complies

Shelterbelt planting has been undertaken, most of the shelterbelts are now well established and would help ensure aerosols and/or odour associated with the discharge of effluent via spray irrigation are mitigated against. There are no drinking water protection zones within 50m of the discharge area. No effluent is discharged within 20m of any surface waterway. At the time of my visit no discharge was occurring onto ground without vegetative cover, and no ponding in the discharge area was observed. There no evidence of dead, dying or diseased plants that would require replacing as per this condition noted during my site visit.

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15 a. The discharge area shall be fenced to prevent stock, vehicle and public access.

b. At either end of the discharge area along Burnham School Road an easy visible sign should state “Potential Health Risks from Aerosolised treated sewage in this area".

Compliance Report:
Complies

The discharge area is well fenced. Signage with the required statement is present at either end of the discharge area.

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16 A notice shall be erected and maintained at all entrances to the site. This notice shall be legible at five (5) metres and shall inform the public of the nature of the activities occurring at the site, and that the disposal of waste by any other person is prohibited.

Compliance Report:
Complies

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17 The discharge shall be managed to ensure that:

a. Aerosols and spray-drift arising from the discharge do not cause offensive or objectionable effects beyond the boundary of the discharge area.

b. Any odour resulting from spray irrigation of wastewater shall not result in offensive or objectionable effects on the environment beyond the boundary of the irrigated area.

Compliance Report:
Unable to determine compliance

There are some areas of the shelter belt that would benefit from replanting. Regarding odour from the operation, there have been minimal odour complaints during this reporting year. While on site I observed the discharge from CP3, there was no odour that would be considered offensive or objectionable as a result of the discharge at the time of my inspection.

18

a. All parts of the discharge area receiving wastewater shall be operated as a cut and carry operation.

b. There shall be no harvesting of crops within 48 hours of any wastewater irrigation.

c. All pasture harvested from the irrigation areas shall be removed for off-site disposal.

Compliance Report:
Complies

A cut and carry pasture management system is operated in all discharge areas. Practice is to cease irrigation on blocks to be cut at least 48 hours prior to harvesting. Samples are taken after the rest period.

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19 A Management Plan shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, at least two (2) months prior to the exercise of this consent. The Management Plan shall:

a. Set out how the activity authorised by this consent shall be operated to enable compliance with the consent conditions.

b. Be maintained at all times and any changes to the Management Plan shall be submitted to the Canterbury Regional Council prior to those changes taking effect.

Compliance Report:
Unable to determine compliance

There has been no update to the management plan since 2013. Please ensure this plan is up to date and incorporates any changes in management as a result of the plant upgrades.

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20 The Management Plan referred to in Condition 19 shall include, but not be limited to, the following:

a. The method of sampling chemicals, quantities of wastewater and frequency of sampling throughout the operation.

b. The testing and calibration of all systems including backup generator, telemetry, and flow meters.

c. Sub-condition cancelled.

d. The monthly monitoring programme of the onsite bores identified on Plan CRC153952C.

Compliance Report:
Not monitored

This condition has been monitored in previous inspections, there has been no change to the management plan.

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21 The discharge shall be sampled from the irrigation pump chamber once per month and analysed for the following:

a. Biochemical Oxygen Demand.

b. Total Suspended Solids.

c. Total Kjeldahl Nitrogen.

d. Ammoniacal Nitrogen.

e. Faecal coliforms.

Compliance Report:
Complies

Weekly samples of each of these parameters are measured and reported on.

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22 Daily records shall be kept of the following:

a. The volume of wastewater applied to land.

b. The irrigation zone over which the discharge is applied.

c. The depth of the application of wastewater.

Compliance Report:
Complies

Daily records of the above information were provided as part of the Annual Report.

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23 Monthly records shall be kept of the following:

a. The total volume of wastewater applied.

b. The total depth of wastewater applied.

c. The average effluent hydraulic loading rate.

d. The nitrogen loading rate (expressed as kilograms of nitrogen per hectare).

e. The mean dry weight of pasture removed from the site.

Compliance Report:
Complies

Monthly records of the above information have been provided as part of the Annual Report.

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24 Prior to the exercise of the consent, the consent holder shall review and update as necessary the 'Excursion Response Plans' (ERP) included in the application to be consistent with the conditions of consent and submit a copy of the revised ERP to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager. Thereafter the ERP shall be maintained at all times and any changes to the ERP shall be submitted to the Canterbury Regional Council prior to those changes taking effect.

Compliance Report:

Complies

An ERP is available, please read the comments under the condition below in relation to initiating the plan.

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25 For the purposes of monitoring the effects of the discharge on groundwater quality, in reference to the bores identified in condition (20):

a. The consent holder shall establish and maintain a minimum of three (3) on-site monitoring bores located down-gradient of the irrigation area and two (2) on-site monitoring bores located up-gradient of the irrigation area for the duration of this consent.

b. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall have screened sections extending from two (2) metres below the lowest water level to one (1) metre above the highest water level.

c. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall be sampled and analysed at least monthly for nitrate nitrogen and Faecal coliform:

d. In the event that the:

i. concentration of nitrate nitrogen in any of the groundwater samples collected from the down-gradient monitoring bores referred to in clause (a) of this condition exceeds eight (8) milligrams per litre and is at least 30 per cent greater than the nitrate nitrogen concentration in the up-gradient bores also referred to in clause (a) of this condition; or

ii. Faecal coliforms exceed 50 coliform forming units (cfu)/ per 100 millilitres in any of the monitoring bores established in accordance with clause (a) of this condition;

Then the consent holder shall follow the response procedure outlined in the Excursion Response Plan.

Compliance Report:
Unable to determine compliance

A minimum of 2 upstream sampling bores and 3 down-stream sampling bores are established and maintained as per condition 25a. Monthly sampling to determine the concentration of nitrate nitrogen and Faecal Coliforms has been conducted.

The nitrate levels in bores M36/7464, M36/20416 and BX23/0206 exceeded 8 mg/L and was at least 30% greater than the nitrate results from the upstream bores on a number of occasions. As discussed with the previous monitoring officer, there is potential the upstream

monitoring bores are not capturing the background nitrate levels from upgradient activities, and therefore the results are not representative of the effect of the discharge on nitrate levels in the groundwater. As a result, I understand the previous officer did not require you to initiate the ERP following exceedances. It is with this in mind this condition has not been graded as non-compliant. However, I am not satisfied with this approach; thus, I am requesting that the ERP is initiated upon any future exceedances as per this condition. I have discussed this situation with one of our groundwater scientists who suggests that SDC installs a monitoring bore in the vicinity of grid reference NZTM 1545314, 5169893 in an attempt to remedy this.

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26 For the purposes of monitoring the effects of the discharge on soils:

a. Samples of soil shall be collected twice annually from the land beneath each centre pivot irrigator or k-line irrigation area that has received treated wastewater irrigation in the previous six (6) months.

b. Sampling shall occur between a depth of zero (0) and 50 millimetres.

c. A minimum of four (4) samples shall be taken from each area sampled and all samples from the wastewater irrigation site shall be combined into a single composite sample and be analysed for the following:

   i. Total cadmium

   ii. Total chromium

   iii. Total copper

   iv. Total lead

   v. Total nickel

   vi. Total zinc

   vii. Total nitrogen

   viii. Total mercury

   ix. Total arsenic

Compliance Report:

Complies

Sampling results for the 19th of July 2017 and the 4th of January have been provided. Samples from each discharge area have been analysed for presence of the above contaminants.

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27 a. If any of the results of any of the analysed samples in accordance with condition 26 exceed the thresholds specified in clause (b) of this condition the consent holder shall:

i. Cease wastewater irrigation over that irrigation area.

ii. Advise the Canterbury Regional Council within ten (10) days of the receipt of the results, and outline the steps taken to address elevated soil concentrations, including any remediation or mitigation measures.

iii. Not recommence wastewater irrigation over that irrigation area until further sampling demonstrates to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, compliance with the thresholds specified in clause (b) of this condition.

b.

c.

Trace Element	Limit (milligrams per kilogram) dry weight
Total Cadmium	1
Total Chromium	600
Total Copper	100
Total Lead	300
Total Nickel	60
Total Zinc Total Mercury	300 1
Total Arsenic	20

Compliance Report:

Complies

Based on the sample results provided, no exceedances of these thresholds occurred.

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28 All samples required under this consent shall be taken by a suitably qualified and experienced person and shall be analysed using methods approved by the American Public Health Association or the American Society for the Testing of Materials by a laboratory that is accredited for that method of analysis by International Accreditation New Zealand (IANZ) or by an organisation with a mutual agreement with IANZ.

Compliance Report:

Complies

Soil sampling is undertaken by Aqualinc. The soil samples were all analysed by Hill Laboratories which is IANZ accredited.

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29 The results of all samples taken under this consent shall be provided to the Canterbury Regional Council within ten (10) working days of receipt of the samples.

Compliance Report:
Unable to determine compliance

I am unable to find any record of these samples being provided to Environment Canterbury within 10 days. Please ensure that these results are sent to ecinfo@ecan.govt.nz attn Monitoring and Compliance within 10 days as required by this condition.

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30 The consent holder shall provide the Canterbury Regional Council with an Annual Monitoring Report each year commencing 12 months from the date of the exercise of this consent. The Annual Monitoring Report shall include, but not be limited to:

a. Monthly monitoring records.

b. All sampling results required under the conditions of consent.

c. Annual average nitrogen loading rate.

d. A record of any complaints from members of the public and actions taken.

e. Status of compliance with consent conditions.

f. Reasons for any non-compliances and actions taken or planned to prevent re-occurrences.

This report shall then become the formal record of results for that year.

Compliance Report:
Complies

The Annual Monitoring Report has been provided by SDC. Included in the report is the monthly monitoring records, sampling results, annual average nitrogen loading rate and an assessment of the status of compliance with consent conditions. Reasons for non-compliances have also been presented.

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31 a. Prior to the construction of the Pines Wastewater Treatment Facility, design plans shall be certified by a Chartered Professional Engineer (CPEng) with at least five (5) years' experience in the design and construction of wastewater treatment systems to confirm that the system has been suitably designed to achieve or better the values set out in Condition 10(a).

b. A copy of the certified design plans shall be submitted to the Canterbury Regional Council, Attention: Environmental Compliance Manager, at least one month prior to construction.

Compliance Report:
Not monitored

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32 a. Prior to the exercise of this consent, the consent holder shall establish a reticulated water supply which provides sufficient water to cover the property holders domestic needs to the properties located within the area bound by Brookside Road, Ellesmere Junction Road and Edwards Road.

b. The consent holder shall maintain the reticulated supply for the duration of this consent and ensure the quality of water supplied complies with New Zealand Drinking Water Standards 2008 criteria.

Compliance Report:
Complies

SDC have provided a list of the properties supplied by their reticulated water supply. The areas listed under Condition 32a are covered by the reticulated supply.

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33 a. In the event of any disturbance of Koiwi Tangata (human bones) or taonga (treasured artefacts), during the construction or installation of the treatment and disposal facilities, the consent holder shall immediately:

i. Cease earthmoving operations in the affected area

ii. Mark off the affected area until earthmoving operations recommence

iii. Advise the Canterbury Regional Council of the disturbance

iv. Advise the Upoko Runanga of Te Taumutu Runanga, or their representative (contact information can be obtained from the Canterbury Regional Council), and the New Zealand Historic Places Trust, of the disturbance.

b. Earthmoving equipment operations shall not recommence until either;

i. the consent holder provides a certificate in writing to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, signed by Upoko Runanga of Taumutu, or their

representative(s), stating that appropriate action has been undertaken in relation to the discovered culturally sensitive material; or

ii. after five (5) working days after advising the Taumutu Runanga, a certificate signed by an archaeologist (i.e., a person with a post graduate degree in archaeology, and who is a member of the New Zealand Archaeological Association) is provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that states that in the archaeologist's opinion appropriate action has been undertaken in relation to the discovered culturally sensitive material. That certificate shall detail the action that has been undertaken by the consent holder. A copy of the archaeologist's qualifications shall also be provided with any such certificate.

Compliance Report:
Not operational

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34 The lapsing provisions of Section 125 of the Resource Management Act 1991 shall not apply to this consent until 31 March 2030.

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35 The Canterbury Regional Council may, once per year, on any of the last five (5) working days of March or September serve notice of its intention to review the conditions of this consent for the purposes of either of the following:

a. Dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.

b. Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

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36 When discharging wastewater to land adjacent to the Plan Change land, the consent holder shall ensure that:

a. The discharge shall be in an aerobic state.

b. The dissolved oxygen concentration shall not be less that a trigger level of 0.5 grams per cubic metre.

c. The dissolved oxygen concentration in the discharge shall be continuously monitored and an alarm fitted that activates in the event that the dissolved oxygen concentration is less than the trigger level in clause (b) of this condition.

d. The dissolved oxygen monitoring device shall be calibrated and serviced annually.

Compliance Report:
Complies

DO levels are continuously monitored at the site, it is reported that these levels do not exceed the trigger level of 0.5 grams per cubic metre. The DO meter is calibrated and serviced annually.

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37 The requirements of Conditions 36(c) and 36(d) shall be undertaken by the consent holder for a minimum of at least two (2) years from the date of commencement of spray irrigation of wastewater to land in accordance with this consent.

Compliance Report:
Not operational

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38 The requirements of Conditions 36(c) and 36(d) shall no longer apply upon provision of a certificate signed by the person responsible for designing the wastewater irrigation system, or by a chartered Professional Engineer (CPEng), to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, certifying that;

a. dissolved oxygen in the discharge has been continuously monitored for at least two (2) years; and

b. the minimum level of dissolved oxygen concentration specified in Condition 36(b) has been continuously met or exceeded during that two (2) year period.

Compliance Report:
Not monitored

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39 If the minimum level of dissolved oxygen concentration specified in Condition 36(b) is breached, or the median concentration of faecal coliforms is greater than 500 colony forming units per 100 millilitre sample, then the following provisions shall apply:

a. Any discharge of treated wastewater to land adjacent to the Plan Change land shall be setback no less than 200 metres from the common boundary as shown

on Plan CRC101109.1C when the winds of any strength are from 170°N to 310°N; provided that

b. When the winds are not from 170°N to 310°N any discharge of treated wastewater shall comply with the setback distances prescribed by Condition 40.

Compliance Report:
Unable to determine compliance

If there is low DO in the CP5 prohibited zone an alarm will trigger. The pivot is now programmed to cease the discharge while it moves out of the zone. E. Coli sampling results show results less than 500CFU/100ml sample. The separation distance with the residential land boundary is > 200 metres. Pivot 7 operation was changed in 2017 and it now irrigates a partial circle. Valves and actuators have recently been installed to enable the outer sprinklers to be shut as the pivot gets closer to the property boundaries associated with Plan Change 8.

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40 In respect of shelter belt planting:

a. The consent holder shall establish a shelter belt comprising three rows of closely planted evergreen trees along the common boundary defined under Condition 39(a).

b. No discharge of treated wastewater to land shall occur within 150 metres of that common boundary until;

   i. the trees referred to in Condition 40(a) have reached a consistent minimum height of three (3) metres and have developed into a dense continuous shelter belt without gaps; and

   ii. the consent holder has demonstrated to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that the boundary plantings comply with Condition 40(b)(i).

c. Following confirmation pursuant to condition 40(b)(ii), discharge of treated wastewater to land may occur up to 25 metres from the common boundary defined under Condition 39(a).

Compliance Report:
Complies

The shelterbelts required by Condition 40 have been planted along the internal boundaries. Currently no discharge occurs within 150 m of the common boundary. Pivot 7 has been reconfigured to ensure that the separation distances are achieved while irrigating as much area under the pivot as possible.

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41 There shall be no end guns associated with the wastewater spray irrigation system located on Pt Lot 1 DP 65117 or Pt RS 33357, being that part of the land subject to this consent located north or Burnham School Road.

Compliance Report:
Complies

There are no end guns on pivots within these areas.

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42 In the event of cessation of irrigation from the wastewater spray irrigation system for more than 24 hours on land adjacent to the Plan Change land, the consent holder shall not start up irrigation from the spray irrigation system within 200 metres of the common boundary defined under Condition 39(a).

Compliance Report:
Not operational

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43 No discharge of treated wastewater to land from a spray irrigation system shall occur within 150 metres of the common boundary defined under Condition 38(i) unless:

a. The spray nozzles are no more than two (2) metres above ground level.

b. The spray nozzles produce large consistent droplets such as produced by the Nelson R3000 brand or similar product.

c. The operating pressure at the spray irrigation nozzle does not exceed 103 kilopascals (kPA).

Compliance Report:
Complies

The centre pivot spray nozzles are within 2 m of the ground level. Nelson R3000 nozzles are used on the Centre Pivots, it is my understanding they are designed with a maximum pressure of 100 kPa.

General comments

On Monday the 16th of July a routine site visit was conducted at The Pines WWTP on Burnham School Road. The purpose of this visit was to assess compliance with the conditions of the consents associated with the plant. On site I meet with David from SDC as well as Daryl Collins and Chris Salkeld of Sicon. Chris is the Treatment Plant Supervisor.

Please feel free to contact me on 027 578 0947 or trinity.white@ecan.govt.nz should you wish to discuss this compliance report further.

Date Inspected: 26 Jul 2018

Monitored By: Trinity White

Signature:

Resource Management Officer II Monitoring and Compliance

General information

Canterbury Regional Council Obligations

Under Section 35 of the Resource Management Act 1991, the Canterbury Regional Council has a duty to monitor all resource consent exercised within its region, to make sure all the conditions are being complied with.

Monitoring Frequency

The frequency with which your consent is monitored will vary according to the type of activity your consent authorises, the conditions imposed and the extent to which you have complied with these conditions on previous visits. **If you fully comply with all conditions then frequency will reduce to the minimum set for the activity.**

Costs

It is the Council's policy to recover all actual and reasonable costs of compliance monitoring of resource consents.

From:	Trinity White
To:	Amit Chauhan
Subject:	CRC153952 The Pines WWTP monitoring report July 2019
Date:	Friday, 23 August 2019 11:38:00 AM
Attachments:	CRC153952 SDC The Pines WWTP CMR July 2019.pdf

Good morning Amit,

Please find attached a copy of the Pines WWTP monitoring report. You will note there are a couple of non-compliances. However, I believe you are already aware of both of these.

Please feel free to contact me if you wish to discuss further.

Kind regards,

Trinity

Environment Canterbury
Regional Council
Kaunihera Taiao ki Waitaha

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23 August 2019

Selwyn District Council
PO Box 90
Rolleston 7643

Dear Sir/Madam

Compliance Monitoring Report
Selwyn - Waihora Water Management Zone

Please find enclosed your compliance monitoring report for the following activity. It is important that you read this report carefully.

Consent number:	CRC153952
Location:	Burnham School Road, Main South Road & Brookside Road, ROLLESTON
Description:	To discharge contaminants to land and to air.

Overall consent compliance: **Non-compliance Action required**

This matter needs your immediate attention.

Complies = 25
Non-compliant No Action Required = 1
Non-compliant Action Required = 2
Unable to Determine Compliance = 2

Reason(s) for non-compliance:

Condition 9 - Exceedance of the 95th Percentile Faecal Coliform standards.

Condition 25 - The depth of the monitoring bores are not meeting the depth and screening requirements of this condition.

Please contact me on 027 578 0947 if you wish to discuss the actions needed to achieve compliance further.

Yours sincerely

Trinity White
RMO II Monitoring & Compliance

Doc No:	*C19C/136235*
Your Customer No:	*EC118692*
File No(s):	*CRC153952*

Consent No: ***CRC153952***

Description of consent	**Commencement Date**
To discharge contaminants to land and to air.	06 Mar 2015
Location	**Expiry Date**
Burnham School Road, Main South Road & Brookside Road, ROLLESTON	17 Dec 2045

Conditions & compliance

1 The discharge shall be only:

a. Treated wastewater originating from the Pines Wastewater Treatment Facility located at Lot 1 DP 309881, Burnham School Road, Burnham as shown on Plan CRC153952A; and

b. Odour and aerosols associated with the spray irrigation of treated wastewater.

Compliance Report:

Complies

The discharge is only wastewater originating from the treatment facility and associated odour and aerosols.

2 The discharge shall only occur within Wastewater Discharge Area A, B and C shown on Plan CRC153952B, and bound by Topo50 map references:

a. Topo50 BX23 459 672, BX23 472 699, BX23 467 708 and BX23 451 699; and

b. Topo50 BX23 453 700, BX23 472 710, BX23 468 717, BX23 454 710, BX23 455 709, BX23 449 716, BX23 450 705 and BX23 451 705.

c. The total combined volume of treated wastewater discharged under this consent and CRC131423 shall not exceed 25,614 cubic metres per day over the wastewater irrigation areas shown on Plan CRC153952B.

d. For the purposes of compliance with this condition the consent holder shall operate a flow meter which continuously monitors the volume of wastewater discharged to the irrigation area.

Compliance Report:

Complies

The maximum discharge occurred on the 13th of February 2019, The volume was 13868.3m^3

3 The consent holder shall ensure that influent volumes of wastewater do not exceed the operating capacity of the treatment and irrigation systems.

Compliance Report:
Complies

The maximum influent volume for the reporting period was 10543.3m^3 on the 2nd of June 2019.

Capacity is reported in Population Equivalent (PE) and is based on 220L/person/day. Whilst on site I was informed the liquid stream is currently 40K PE/day and the solids stream is currently 30k PE/day. I was informed by Amit upgrades to the plant due for completion September 2021 will increase the capacity to 45-50K PE.

Solids Stream
Sludge Digester = Unknown. Please confirm.
Bioreactor x 3 @ 15K each = 45K
Solids Handling Centrifuge x 2 @ 15K = 30K (nb. more capacity can be built in by running more than 40hrs)
Solar Drying Beds x 2 @ 15K each = 30K.

Nb. Whilst on site I was informed the extra capacity in the bioreactor is reducing dependency on the sludge digester.

Liquid Stream
Inlet Works X 1 @ 60K = 60K
UV Disinfection x 2 @ 30K each = 60K
Clarifier x 2 @ 20K each = 40K

Stantec have reported the following operating capacities for Pines III. As seen below, based on the information from Stantec the maximum influent volume does not exceed the operating capacity.

The design capacity for the Pines III WWTP is 45,000PE. However, some civil works, such as the inlet works channels, are designed for the future site layout for 60,000 PE. The table below summarises the design capacity to be provided for Pines III WWTP.

Table 3-3: Process Unit Design Capacity

Component	Civil Works	Mechanical Supply	Comments
Inlet Screens	60,000 PE	45,000PE	
Grit Removal	60,000 PE	60,000PE	
Bioreactors	60,000 PE	45,000 PE	15,000 PE each
Clarifiers	60,000 PE	60,000 PE	Construction of the third bioreactor increased the capacity of the existing clarifiers
UV Disinfection Channels	60,000 PE	60,000 PE	

Component	Civil Works	Mechanical Supply	Comments
Irrigation Pump Station wet well	60,000 PE	45,000 PE	
Centre Pivot Irrigators	84,000 PE	61,600 PE	Staged development
Dewatering Centrifuges	60,000 PE	60,000 PE	
Solar Drying Halls	40,000 PE	40,000 PE	July 2019: under procurement to increase capacity to 58,000 PE

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4 The consent holder shall ensure that:

a. The discharge receives ultra-violet disinfection prior to irrigation.

b. The median concentration of faecal coliforms in the discharge shall not exceed 500 faecal colony forming units per 100 millilitre sample.

c. An alarm is fitted to the ultra-violet disinfection system which activates in the event that an inadequate dose is applied.

The ultra-violet disinfection system is calibrated and serviced annually.

Compliance Report:
Complies

a. The discharge receives UV disinfection prior to irrigation.
b. The highest monthly median Faecal Coliform sample results were 370 cfu/100ml in November 2018.
c. The UV disinfection system is fitted with an alarm system.

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5 Alarm systems shall be installed at the treatment plant to warn of a power failure or a failure of any critical treatment system components. Standby power generation shall be available at all times the plant is operational.

Compliance Report:
Complies

During my visit I was informed by the plant manager Chris that a number of alarms are installed to warn of power failure. These alarms are linked to various employees who are alerted in the event of power and/or equipment failure. A standby generator is available.

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6 The discharge shall occur only via a spray irrigation system.

Compliance Report:
Complies

The discharge occurs via center pivots.

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7 The application depth of the discharge shall not exceed 64 millimetres over any consecutive five (5) day period, and no single application shall exceed a depth of 20 millimetres.

Compliance Report:

Complies

Based on the information supplied, the maximum daily application depth of 20mm and 5-day period have not been exceeded.

Please note, the manner in which the application depth is being reported is not correct. Please see the example below.

26 Jan 2019 - CP3

Reported application depth of 6.6mm on this day, when the maximum application depth was in fact 19.73mm.

Daily Runtime = 1201 minutes
Time Taken to Complete Revolution = 546 minutes
1201 / 546 = 2.2 revolutions completed on this day

Total Volume Discharged = 1818.3m^3
1818.3m^3 / 2.2 revolutions = 826.36m^3 discharged per revolution

Total Discharge Area = 125,664m^2
826.36m^3 / 125,664m^2 = 0.0066m x 1000 = 6.57mm

Therefore, the application depth is as follows:
1 Revolution = 6.57mm
2 Revolutions = 13.15mm
3 Revolutions = 19.73mm

Daily Volume (m3)	Daily Run Time (Minutes)	Daily Application Depth	Number of Revolutions	Volume dishcarge per Revolution (m3)	Application Depth for 1 Rev (mm)	No of Rev * App Depth for 1 Rev *mm)	Discharge Area (m2)
1818.3	1201.0	1514.0	2.2	826.6	6.6	19.7	125664

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8 The discharge shall not exceed a monthly average hydraulic loading rate of eight (8) millimetres per day.

Compliance Report:

Complies

The highest monthly average hydraulic loading rate was 7.19mm for CP4 in January 2019.

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9 a. Prior to irrigation, the discharge shall be treated to ensure the following standards are met:

Parameter	Median*	95th Percentile*
Biochemical Oxygen Demand (BOD)	15	60
Suspended Solids	20	90
Total Nitrogen	7	35
Faecal Coliforms (cfu/100ml)	500	1,000

*All values are expressed in grams per cubic metre except faecal coliforms which are expressed colony-forming units per 100 millilitre sample.

b. In order to demonstrate compliance with Condition 9(a), samples of wastewater shall be taken from the pump chamber and analysed at least monthly.

Compliance Report:

Non-compliance Action required

Weekly samples are taken from reported on in the Annual Report. The annual report (Appendix D) shows the 95th Percentile ecoli to be 2380 cfu/100ml. This is non-compliant with the 95th Percentile limit of 1,000 cfu/100ml. The following information has been provided in response to this non-compliance.

SDC have identified stagnation of the water in the sampling tap extension pipe as the primary cause for these exceedances. Since there is no residual disinfection, there is likelihood of FC growth in the pipe and reflected in some samples. Council has found the purging of the tap to be inadequate and believe the location and geometry of the sample point was not a true representation of the water discharged from the treated water tank. In response, SDC have changed the location of the tap and brought it closer to the discharge pumps. Additionally, there is a maintenance schedule for the wet well to keep it in good condition and I understand improvements have been made to discourage the algal growth.

I note since the new sampling location was installed in March, that the FC levels have not been above 1,000 cfu/100ml since this time. I have discussed the grading of this condition with a Technical Lead as Council has undertaken actions to try to identify and eliminate the cause of these exceedances. However, considering there is only 3 months data (March - July) to test the hypothesis that the high results are due to stagnation, the action required in response to this non-compliance is to continue to monitor, to confirm any issues have been adequately addressed. This non-compliance will be considered to be resolved once 1 year of data showing no exceedances is available.

Audit sample results - 11 June 2019
BOD 5g O2/m3
SS 5g/m3
TN 5.3 g/m3
FC 52 cfu/100mL
TP 0.88g/m3
TKN 2.2g/m3
Nitrate-N + Nitrite-N 3.1g/m3

10 There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours.

Compliance Report:

Complies

Whilst on site I observed the discharge from CP7. No ponding was evident within the grassed discharge area, however I did note wastewater ponding within the pivot ruts. As seen in the photo below, the ponding was quite deep. I was informed these ruts were last filled in approximately 3-4 years ago. As expected, the pivot ruts are quite compacted and do not contain any grass medium, meaning little treatment is being provided to wastewater ponding in these areas. I recommend filling these ruts with a gravel medium on a more frequent basis to allow for some treatment to be provided, particularly considering these areas are prone to ponding of wastewater. Whilst not best practice, I believe the ponding is unlikely to have remained beyond 48 hours, and therefore have graded this condition as compliant.

You will also note in the photo one of the hoses had a leak resulting in an uneven application. Please ensure the pivots are regularly checked while in operation.

11 The discharge shall be managed to ensure that there shall be no discharge within 20 metres of any surface water body and the run-off of wastewater into any surface waterbody is prevented.

Compliance Report:
Complies

12 All stockwater races within the wastewater irrigation areas shown on Plan CRC153952D shall be piped or otherwise closed by 28 February 2017.

Compliance Report:
Unable to determine compliance

The stock water race running through the centre of the discharge area has been closed. One stock water race remains adjacent to the discharge are covered by CP5. A buffer of greater than 20m is currently in place, furthermore there is a boundary hedge between the discharge area and the stock water race. The race is just within the area on Plan CRC153952D but outside of the 'wastewater irrigation area' as defined by Plan CRC153952B. After discussing this with a senior officer, I suggest that the race may remain, providing there continues to be a buffer of at least 20m and the boundary shelterbelt remains and is well maintained to ensure no spray drift enters the race.

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13 The discharge of treated wastewater shall only occur within the area labelled “Discharge Area A, B and C” on Plan CRC153952B according to the following setback distances:

a. Discharge Area A” no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *“Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land” or its successor, with wastewater spray irrigation set back by:*

   i. *No less than 40 metres from any site boundary where complying shelter is established*; or*

   ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.*

b. Within “Discharge Area B” no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *“Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land” or its successor, with wastewater spray irrigation set back by:*

   i. *No less than 15 metres from any site boundary where complying shelter is established*; or*

   ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.*

c. Within “Discharge Area C” no wastewater spray irrigation shall commence within 10 metres of any site boundaries.

Compliance Report:

Unable to determine compliance

Whilst on site I viewed the boundary hedge within Discharge Area B. It was difficult to assess compliance with the various set back distances due to the large scale of the discharge area and number of hedges. However, I did not some areas where the boundary hedge was missing trees. I recommend Sicon conduct an audit into the height and density of planting for all of the shelter belts detailed under this condition to ensure compliance is achieved.

14

a. The consent holder shall undertake shelter planting as necessary to ensure that the effects of spray and aerosols from wastewater irrigation are not offensive or objectionable beyond the site boundary.* Note Wastewater spray irrigation is also precluded from occurring on Pt Lot 2 DP 82068 (as per the conditions of the designation)

b. Effluent shall not be applied:

    i. Onto land within 50 metres of any active community used for water extraction not owned by the holder of this consent and any community supply protection zones;

    ii. Onto land within 20 metres of any surface waterway;

    iii. Onto ground with no vegetative cover;

    iv. Onto ground where surface ponding is occurring; and

    v. There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours.

c. The consent holder shall prepare a Landscape Plan and shall provide it to the Canterbury Regional Council, Attn: RMA Compliance and Enforcement Manager prior to the commencement of planting confirming that the planting is consistent with the requirements of the Department of Public Health Public Health Services 1992 Guideline or its successor. The Landscape Plan shall include, but not be limited to, the following information:

    i. The location and extent of each area of shelter planting.

    ii. The species to be planted and the anticipated height of each plant following establishment.

    iii. The minimum plant size and spacing required at planting to achieve the minimum plant height defined in clause (b) of this condition prior to the commencement of wastewater spray irrigation.

d. Once established the landscaping shall be maintained for the duration of the exercise of the consent, with any dead, dying or diseased plants being replaced within one growing season within plants of a similar species and in accordance with the planting specified in the Landscape Plan required under clause (c).

Compliance Report:

Not monitored

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15 a. The discharge area shall be fenced to prevent stock, vehicle and public access.

b. At either end of the discharge area along Burnham School Road an easy visible sign should state " Potential Health Risks from Aerosolised treated sewage in this area".

Compliance Report:
Complies

The discharge area is well fenced and the gates to each area locked. Signage with the required statement is present at either end of the discharge area.

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16 A notice shall be erected and maintained at all entrances to the site. This notice shall be legible at a distance of five (5) metres and shall inform the public of the nature of the activities occurring at the site, and that the disposal or waste by any other person is prohibited.

Compliance Report:
Complies

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17 The discharge shall be managed to ensure that:

a. Aerosols and spray-drift arising from the discharge do not cause offensive or objectionable effects beyond the boundary of the discharge area.

b. Any odour resulting from spray irrigation of wastewater shall not result in offensive or objectionable effects on the environment beyond the boundary of the irrigated area.

Compliance Report:
Complies

Whilst on site I observed the discharge from CP5 there was no odour that would be considered offensive or objectionable as a result of the discharge at the time of my inspection. Following my visit I drove around the boundary of the discharge area and did not note any spray-drift or aerosols arising from this discharge.

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18 a. All parts of the discharge area receiving wastewater shall be operated as a cut and carry operation.

b. There shall be no harvesting of crops within 48 hours of any wastewater irrigation.

c. All pasture harvested from the irrigation areas shall be removed for off-site disposal.

Compliance Report:
Complies

All parts of the discharge area currently receiving wastewater are operated as a cut and carry operation. All pasture harvested is removed off-site (generally to the neighbouring farm) for disposal.

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19 A Management Plan shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, at least two (2) months prior to the exercise of this consent. The Management Plan shall:

a. Set out how the activity authorised by this consent shall be operated to enable compliance with the consent conditions.

b. Be maintained at all times and any changes to the Management Plan shall be submitted to the Canterbury Regional Council prior to those changes taking effect.

Compliance Report:
Complies

A revised Management Plan (30/07/2019) has been completed by Stantec and provided by SDC (INT REF# C19C/125351)

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20 The Management Plan referred to in Condition 19 shall include, but not be limited to, the following:

a. The method of sampling chemicals, quantities of wastewater and frequency of sampling throughout the operation.

b. The testing and calibration of all systems including backup generator, telemetry, and flow meters.

c. Sub-condition cancelled.

d. The monthly monitoring programme of the onsite bores identified on Plan CRC153952C.

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21 The discharge shall be sampled from the irrigation pump chamber once per month and analysed for the following:

a. Biochemical Oxygen Demand.

b. Total Suspended Solids.

c. Total Kjeldahl Nitrogen.

d. Ammoniacal Nitrogen.

e. Faecal coliforms.

Compliance Report:

Complies

Table 3.5 – Sampling Results for Compliance with Condition 9(a) and Provides the Median and the 95th Percentile Values

Month	FEC cfu/100 ml	NH_3 g/m³	NNN g/m³	TKN g/m³	TN g/m³	TP g/m³	ECO cfu/100 ml	T-BOD g/m³	pH	SS g/m³
Jul-18	110	0.478	3.9	2.9	6.7	3.1	43	5.5	7.5	8
Aug-18	2784	0.301	1.7	3.6	4.8	2.0	1892	8.2	7.6	11
Sep-18	980	0.835	1.3	3.2	4.5	3.6	423	5.8	7.5	11
Oct-18	1830	1.532	1.2	3.8	5.0	4.5	1288	6.0	7.7	8
Nov-18	570	0.193	0.7	2.2	2.9	5.7	325	4.8	7.5	6
Dec-18	86	0.984	1.9	3.2	5.1	6.3	40	4.8	7.8	7
Jan-19	278	0.125	2.7	2.0	4.7	3.4	154	3.0	7.8	5
Feb-19	348	0.190	3.9	7.8	6.3	5.1	73	3.3	7.8	7
Mar-19	406	0.114	4.8	2.4	7.2	5.0	86	5.2	7.6	7
Apr-19	1558	0.092	3.7	1.7	5.5	3.4	145	2.8	7.7	3
May-19	406	0.114	4.8	2.4	7.2	5.0	86	5.2	7.6	7

Audit sample results - 11 June 2019

BOD 5g O2/m3
SS 5g/m3
TN 5.3 g/m3
FC 52 cfu/100mL
TP 0.88g/m3
TKN 2.2g/m3
Nitrate-N + Nitrite-N 3.1g/m3

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22 Daily records shall be kept of the following:

a. The volume of wastewater applied to land.

b. The irrigation zone over which the discharge is applied.

c. The depth of the application of wastewater.

Compliance Report:

Complies

Records have been provided showing the volume of wastewater applied to land as well as the discharge area. The depth of the application has also been provided, however the depth

assumes only one pivot revolution. Please report maximum application depths per day in future reporting.

For example, on the 26th of January 2019, the application depth for CP3 is quoted as being 6.6mm. However, the center pivot did 2.2 revolutions on this particular day, meaning in reality the pivot passed over part of the irrigation area 3 times. Therefore, the maximum irrigation application depth is infact 19.73mm not 6.6mm.

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23 Monthly records shall be kept of the following:

a. The total volume of wastewater applied.

b. The total depth of wastewater applied.

c. The average effluent hydraulic loading rate.

d. The nitrogen loading rate (expressed as kilograms of nitrogen per hectare).

e. The mean dry weight of pasture removed from the site.

Compliance Report:
Complies

Monthly records are kept of each of the required parameters. However, as previously noted (condition 6, 7 and 8) there is an error in how the depth and hydraulic loading are being reported currently.

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24 Prior to the exercise of the consent, the consent holder shall review and update as necessary the 'Excursion Response Plans' (ERP) included in the application to be consistent with the conditions of consent, and submit a copy of the revised ERP to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager. Thereafter the ERP shall be maintained at all times and any changes to the ERP shall be submitted to the Canterbury Regional Council prior to those changes taking effect.

Compliance Report:
Complies

An Excursion Response Plan was provided in 2016 (int ref #C16C/15733). A copy of the ERP can also be found within the recently revised Management Plan (C19C/125351).

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25 For the purposes of monitoring the effects of the discharge on groundwater quality, in reference to the bores identified in condition (20):

a. The consent holder shall establish and maintain a minimum of three (3) on-site monitoring bores located down-gradient of the irrigation area and two (2) on-site

monitoring bores located up-gradient of the irrigation area for the duration of this consent.

b. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall have screened sections extending from two (2) metres below the lowest water level to one (1) metre above the highest water level.

c. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall be sampled and analysed at least monthly for nitrate nitrogen and Faecal coliform:

d. In the event that the:

   i. concentration of nitrate nitrogen in any of the groundwater samples collected from the down-gradient monitoring bores referred to in clause (a) of this condition exceeds eight (8) milligrams per litre and is at least 30 per cent greater than the nitrate nitrogen concentration in the up-gradient bores also referred to in clause (a) of this condition; or

   ii. Faecal coliforms exceeds 50 coliform forming units (cfu)/ per 100 millilitres in any of the monitoring bores established in accordance with clause (a) of this condition;

Then the consent holder shall follow the response procedure outlined in the Excursion Response Plan.

Compliance Report:
Non-compliance Action required

a. As discussed during our meeting with groundwater scientist Fouad Alkhaier on the 24.07.2019 the CP on the corner of Burnham Road and Brookside Road is not well covered by a suitable downgradient bore. Please look to install a down gradient bore to capture this pivot when upgrading the bores to achieve compliance with Condition 25(b).

b. The nearest groundwater level monitoring bore (M36/0465) is located 1km south of the wastewater disposal area. Groundwater this year is reported to be at a depth of -5m RGL. The minimum groundwater level is -9.6 RGL and maximum -3.3m RGL. Therefore, the groundwater monitoring bores noted in Condition 25(a) should be screened from 2m below the lowest water level (i.e approx 11.6m) and 1m above the highest water level (i.e. approx. 2.3m). I have detailed the depth and screened sections of each of the monitoring bores below. Based on this information, I do not believe these bores meet the requirement of Condition 25(b). As discussed during our meeting in July please stay in contact with Fouad and myself to ensure the new bores are screened to an appropriate depth and to discuss options for retaining some of the existing bores where appropriate to minimise the cost to Council.

Upgradient
BX23/0204 = 22.5m (screened 18m - 21m)

BX23/0205 = 24m (screened 21m - 24m)
BX23/0878 = 18m (screened 6m - 18m)

Downgradient
BX23/0206 = 13.9m (screened 8.9m - 13.9m)
BX23/0207 = 14m (screened 9m - 12m)
M36/7464 = 16.5m (screened 7.5m to 16.5m)
BX23/0208 = 17m (screened 11m to 14m)

c. Groundwater is sampled and analysed at least monthly for nitrate nitrogen and Faecal coliforms.

d.
i.) As seen in the table below, a number of nitrate exceedances occurred over the reporting period. Thank you for providing the follow up lab results. Having reviewed these reports, I consider further clarification is required regarding:
* The time frame for resampling
* The bores that should be resampled
* How this information is submitted to Environment Canterbury

Monitoring Well No.	Location	Well Depth in M	Lab no: 2005646	Lab no: 20019974	Lab no: 2038901	Lab no: 2043588	Lab no: 2054225	Lab no: 2072189	Lab no: 2083352	Lab no: 2072191	Lab no: 2115766	Lab no: 2072193	Lab no: 2148100	Lab no: 2072195	Lab no: 2180983
			26-Jun-18	24-Jul-18	28-Aug-18	5-Sep-18	25-Sep-18	30-Oct-18	20-Nov-18	18-Dec-18	29-Jan-19	28-Feb-19	25-Mar-19	29-Apr-19	23-May-19
M36/7463	Downstream		2.1	0.976	1.46		2.1	1.39	1.5	1.81	0.88	1.21	1.22	6.2	1.38
BX23/0204	Upstream	22.5	3.5	2.75	3	6.2	5.9	4.7	1.5	5.5		4.3	0.12	2.9	5.2
BX23/0205	Upstream	24	**3.3**	**3.86**	**4.1**	**6.3**	**7.1**	**6.5**	**6.7**	**5**		**4.4**	**6.5**	**9.1**	**9.4**
BX23/0878	Upstream (New-Feb 2019)	18										**23**	**24**	**22**	**23**
	Upstream average value		***3.4***	***3.305***	***3.55***	***6.25***	***6.5***	***5.6***				***10.57***	***10.21***	***11.33***	***12.53***
	30% of highest UG sample			5.018	5.33	8.19	9.23	8.45	8.71	6.5	0				
M36/7667	Downstream		1.88	3.32	1.51		3.9	0.98	2.9	4.5	1.43	1.33	1.14	1.39	1.31
M36/7668	Downstream		2.7	0.656	0.57		0.68	0.43	0.91	0.58	0.82	1.05	1.72	6.8	1.12
BX23/0206	Downstream	13.9	**6.1**	**6.52**	**8.4**	**8.7**	8.5	**9.2**	**8**	**8.5**	**8.5**	**5.2**	**8.6**	**5.3**	**0.74**
BX23/0207	Downstream	14	**5.1**	**1.53**	**0.81**		**2.7**	**4**	**2.9**	**4.3**	**2.4**	**0.22**	**1**	**0.62**	**0.74**
M36/20415	Downstream		3.3	3.96	4.3		3.9	3.1	3	3.2	3.5	5.9	6.4	10	7.1
M36/20416	Downstream		4.3	2.22	3.5		3.2	2.5	1.5	0.183	4.1	4	3.7	3.6	3.7
M36/7464	Downstream	16.5	**3**	**3.42**	**3.7**		**4**	**2.7**	**2.9**	**5.2**	**5.8**	**4.6**	**4.6**	**7.3**	**6.1**
BX23/0208	Downstream	17	**7.8**	**0.002**	**2.6**		**0.017**	**0.004**	**0.002**	**0.039**	**8.1**	**0.28**	**0.003**	**3.4**	**0.33**

ii) Based on the information provided faecal coliform concentrations did not exceed 50 cfu/100ml in any of the monitoring bores established. I.e. the bores listed above.

---

26 For the purposes of monitoring the effects of the discharge on soils:

a. Samples of soil shall be collected twice annually from the land beneath each centre pivot irrigator or k-line irrigation area that has received treated wastewater irrigation in the previous six (6) months.

b. Sampling shall occur between a depth of zero (0) and 50 millimetres.

c. A minimum of four (4) samples shall be taken from each area sampled and all samples from the wastewater irrigation site shall be combined into a single composite sample and be analysed for the following:

i. Total cadmium

ii. Total chromium

iii. Total copper

iv. Total lead

v. Total nickel

vi. Total zinc

vii. Total nitrogen

viii. Total mercury

ix. Total arsenic

Compliance Report:
Complies

---

27 a. If any of the results of any of the analysed samples in accordance with condition 26 exceed the thresholds specified in clause (b) of this condition the consent holder shall:

i. Cease wastewater irrigation over that irrigation area.

ii. Advise the Canterbury Regional Council within ten (10) days of the receipt of the results, and outline the steps taken to address elevated soil concentrations, including any remediation or mitigation measures.

iii. Not recommence wastewater irrigation over that irrigation area until further sampling demonstrates to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, compliance with the thresholds specified in clause (b) of this condition.

b.

c.

Trace Element	Limit (milligrams per kilogram) dry weight
Total Cadmium	1
Total Chromium	600
Total Copper	100
Total Lead	300
Total Nickel	60
Total Zinc Total Mercury	300 1
Total Arsenic	20

28 All samples required under this consent shall be taken by a suitably qualified and experienced person, and shall be analysed using methods approved by the American Public Health Association or the American Society for the Testing of Materials by a laboratory that is accredited for that method of analysis by International Accreditation New Zealand (IANZ) or by an organisation with a mutual agreement with IANZ.

29 The results of all samples taken under this consent shall be provided to the Canterbury Regional Council within ten (10) working days of receipt of the samples.

Compliance Report:
Non-compliance No action required

Compliance with this condition was not met during the previous sampling year. As such a note was included in the Compliance Monitoring Report requesting these results are submitted to ecinfo@ecan.govt.nz as per this condition. I note these results have not been submitted within 10 days in accordance with this condition. Therefore this condition has been graded as non-compliant, no action required.

30 The consent holder shall provide the Canterbury Regional Council with an Annual Monitoring Report each year commencing 12 months from the date of the exercise of this consent. The Annual Monitoring Report shall include, but not be limited to:

a. Monthly monitoring records.

b. All sampling results required under the conditions of consent.

c. Annual average nitrogen loading rate.

d. A record of any complaints from members of the public and actions taken.

e. Status of compliance with consent conditions.

f. Reasons for any non-compliances and actions taken or planned to prevent re-occurrences.

This report shall then become the formal record of results for that year.

31 a. Prior to the construction of the Pines Wastewater Treatment Facility, design plans shall be certified by a Chartered Professional Engineer (CPEng) with at least five (5) years experience in the design and construction of wastewater

treatment systems to confirm that the system has been suitably designed to achieve or better the values set out in Condition 10(a).

b. A copy of the certified design plans shall be submitted to the Canterbury Regional Council, Attention: Environmental Compliance Manager, at least one month prior to construction.

---

32 a. Prior to the exercise of this consent, the consent holder shall establish a reticulated water supply which provides sufficient water to cover the property holders domestic needs to the properties located within the area bound by Brookside Road, Ellesmere Junction Road and Edwards Road.

b. The consent holder shall maintain the reticulated supply for the duration of this consent and ensure the quality of water supplied complies with New Zealand Drinking Water Standards 2008 criteria.

Compliance Report:
Complies

Based on the maps provided, the reticulated supply runs north to south down Burnham Road up to and including property 99. The full extent of Ellesmere Junction Road, Brookside Road and Edwards Road as required have a reticulated supply available to them. The maps are available at (C19C/21968).

---

33 a. In the event of any disturbance of Koiwi Tangata (human bones) or taonga (treasured artefacts), during the construction or installation of the treatment and disposal facilities, the consent holder shall immediately:

i. Cease earthmoving operations in the affected area

ii. Mark off the affected area until earthmoving operations recommence

iii. Advise the Canterbury Regional Council of the disturbance

iv. Advise the Upoko Runanga of Te Taumutu Runanga, or their representative (contact information can be obtained from the Canterbury Regional Council), and the New Zealand Historic Places Trust, of the disturbance.

b. Earthmoving equipment operations shall not recommence until either;

i. the consent holder provides a certificate in writing to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, signed by Upoko Runanga of Taumutu, or their

representative(s), stating that appropriate action has been undertaken in relation to the discovered culturally sensitive material; or

ii. after five (5) working days after advising the Taumutu Runanga, a certificate signed by an archaeologist (i.e., a person with a post graduate degree in archaeology, and who is a member of the New Zealand Archaeological Association) is provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that states that in the archaeologist's opinion appropriate action has been undertaken in relation to the discovered culturally sensitive material. That certificate shall detail the action that has been undertaken by the consent holder. A copy of the archaeologist's qualifications shall also be provided with any such certificate.

---

34 The lapsing provisions of Section 125 of the Resource Management Act 1991 shall not apply to this consent until 31 March 2030.

---

35 The Canterbury Regional Council may, once per year, on any of the last five (5) working days of March or September serve notice of its intention to review the conditions of this consent for the purposes of either of the following:

a. Dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.

b. Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

---

36 When discharging wastewater to land adjacent to the Plan Change land, the consent holder shall ensure that:

a. The discharge shall be in an aerobic state.

b. The dissolved oxygen concentration shall not be less that a trigger level of 0.5 grams per cubic metre.

c. The dissolved oxygen concentration in the discharge shall be continuously monitored and an alarm fitted that activates in the event that the dissolved oxygen concentration is less than the trigger level in clause (b) of this condition.

d. The dissolved oxygen monitoring device shall be calibrated and serviced annually.

Compliance Report:
Complies

Based on the information provided in the annual report DO levels do not exceed the consented trigger limit of 0.5 grams per cubic meter. Do levels are continuously monitored at the site. According to Chris, the DO meter is calibrated and service annually.

---

37 The requirements of Conditions 36(c) and 36(d) shall be undertaken by the consent holder for a minimum of at least two (2) years from the date of commencement of spray irrigation of wastewater to land in accordance with this consent.

---

38 The requirements of Conditions 36(c) and 36(d) shall no longer apply upon provision of a certificate signed by the person responsible for designing the wastewater irrigation system, or by a chartered Professional Engineer (CPEng), to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, certifying that;

a. dissolved oxygen in the discharge has been continuously monitored for at least two (2) years; and

b. the minimum level of dissolved oxygen concentration specified in Condition 36(b) has been continuously met or exceeded during that two (2) year period.

---

39 If the minimum level of dissolved oxygen concentration specified in Condition 36(b) is breached, or the median concentration of faecal coliforms is greater than 500 colony forming units per 100 millilitre sample, then the following provisions shall apply:

a. Any discharge of treated wastewater to land adjacent to the Plan Change land shall be setback no less that 200 metres from the common boundary as shown on Plan CRC101109.1C when the winds of any strength are from 170°N to 310°N; provided that

b. When the winds are not from 170°N to 310°N any discharge of treated wastewater shall comply with the setback distances prescribed by Condition 40.

Compliance Report:
Complies

CP5 is fitted with an alarm in the event of low DO within the CP5 prohibited zone. Further to this the pivot is programmed to cease the discharge while it moves outside of the specified zone. The required separation distance from the residential land boundary of >200 m is adhered to. E.Coli sampling results provided as part of the annual report show results of less than 500CFU/100ml sample. The pivots are fitted with valves and actuators to allow the outer sprinklers to be shut off as the pivot approaches the property boundary's associated with Plan

Change 8. I am told wind direction is closely monitored to ensure compliance with Condition 39(b).

---

40 In respect of shelter belt planting:

a. The consent holder shall establish a shelter belt comprising three rows of closely planted evergreen trees along the common boundary defined under Condition 39(a).

b. No discharge of treated wastewater to land shall occur within 150 metres of that common boundary until;

i. the trees referred to in Condition 40(a) have reached a consistent minimum height of three (3) metres and have developed into a dense continuous shelter belt without gaps; and

ii. the consent holder has demonstrated to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that the boundary plantings comply with Condition 40(b)(i).

c. Following confirmation pursuant to condition 40(b)(ii), discharge of treated wastewater to land may occur up to 25 metres from the common boundary defined under Condition 39(a).

---

41 There shall be no end guns associated with the wastewater spray irrigation system located on Pt Lot 1 DP 65117 or Pt RS 33357, being that part of the land subject to this consent located north or Burnham School Road.

Compliance Report:
Complies

There are no end guns on this pivot.

---

42 In the event of cessation of irrigation from the wastewater spray irrigation system for more than 24 hours on land adjacent to the Plan Change land, the consent holder shall not start up irrigation from the spray irrigation system within 200 metres of the common boundary defined under Condition 39(a).

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43 No discharge of treated wastewater to land from a spray irrigation system shall occur within 150 metres of the common boundary defined under Condition 38(i) unless:

a. The spray nozzles are no more than two (2) metres above ground level.

b. The spray nozzles produce large consistent droplets such as produced by the Nelson R3000 brand or similar product.

c. The operating pressure at the spray irrigation nozzle does not exceed 103 kilopascals (kPA).

Compliance Report:

Complies

The centre pivot in this area is fitted with R3000 nozzles. Amit informed me they are designed to achieve a maximum pressure of 100kPa. The nozzles are within 2m of the ground level.

General comments

On the 11th of June 2019 I visited the The Pines WWTP. On site I met with Amit Chauhan (SDC) and Chris Salkeld (Sicon). Thank you both for assisting me with my visit.

If you have any queries regarding this compliance monitoring report or your resource consent, please feel free to contact me on 027 578 0947.

Date Inspected: 04 Jul 2019

Monitored By: Trinity White

Signature: _____

RMO II Monitoring & Compliance

General information

Canterbury Regional Council Obligations

Under Section 35 of the Resource Management Act 1991, the Canterbury Regional Council has a duty to monitor all resource consent exercised within its region, to make sure all the conditions are being complied with.

Monitoring Frequency

The frequency with which your consent is monitored will vary according to the type of activity your consent authorises, the conditions imposed and the extent to which you have complied with these

conditions on previous visits. **If you fully comply with all conditions then frequency will reduce to the minimum set for the activity.**

Costs

It is the Council's policy to recover all actual and reasonable costs of compliance monitoring of resource consents.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636
200 Tuam Street
PO Box 345
Christchurch 8140
E. ecinfo@ecan.govt.nz
www.ecan.govt.nz

12 February 2019

Selwyn District Council
PO Box 90
Rolleston 7643

Dear Sir/Madam

Compliance Monitoring Report
Selwyn - Waihora Water Management Zone

Please find enclosed your compliance monitoring report for the following activity. It is important that you read this report carefully.

Consent number:	CRC153952
Location:	Burnham School Road, Main South Road & Brookside Road, ROLLESTON
Description:	To discharge contaminants to land and to air.

Overall consent compliance: **Complies**

Thank you for complying with the resource consent conditions that have been monitored. If you continue to fully comply with all conditions then the frequency of monitoring will reduce to the minimum set for the activity.

Reminder(s)

- Please provide discharge records showing the monthly average hydraulic loading rate for each of the 7 pivots, so compliance can be reassessed prior to the release of this year's annual report.
- Can you please provide groundwater monitoring information for the period 1 November 2018 (i.e. following Robson's discharge ceasing to present.)

If you would like any further information regarding this report please do not hesitate to contact me.

Yours sincerely

Trinity White
RMO II Monitoring & Compliance

Consent No: ***CRC153952***

Description of consent	**Commencement Date**
To discharge contaminants to land and to air.	06 Mar 2015
Location	**Expiry Date**
Burnham School Road, Main South Road & Brookside Road, ROLLESTON	17 Dec 2045

Conditions & compliance

1 The discharge shall be only:

a. Treated wastewater originating from the Pines Wastewater Treatment Facility located at Lot 1 DP 309881, Burnham School Road, Burnham as shown on Plan CRC153952A; and

b. Odour and aerosols associated with the spray irrigation of treated wastewater.

Compliance Report:

Unable to determine compliance

At the time of my visit discharges were only treated wastewater originating from the Pines Wastewater Treatment Facility and odour/aerosols associated with this discharge.

Nb. On Friday 2nd of November 2018, SDC became aware of the discharge of animal effluent within the land parcel occupied by the Pines WWTP. Robson's environmental was responsible for the discharge, and investigations suggest permission was sought by the grazing leasee and not Selwyn District Council as the property owners. I understand, the discharge was not taking place within the Pines discharge areas, rather the adjacent farm land. An investigation into Robson's Environmental was carried out and the practice has now ceased.

2 The discharge shall only occur within Wastewater Discharge Area A, B and C shown on Plan CRC153952B, and bound by Topo50 map references:

a. Topo50 BX23 459 672, BX23 472 699, BX23 467 708 and BX23 451 699; and

b. Topo50 BX23 453 700, BX23 472 710, BX23 468 717, BX23 454 710, BX23 455 709, BX23 449 716, BX23 450 705 and BX23 451 705.

c. The total combined volume of treated wastewater discharged under this consent and CRC131423 shall not exceed 25,614 cubic metres per day over the wastewater irrigation areas shown on Plan CRC153952B.

d. For the purposes of compliance with this condition the consent holder shall operate a flow meter which continuously monitors the volume of wastewater discharged to the irrigation area.

Compliance Report:
Complies

Wastewater discharge is via center pivot. CP5 and CP6 have recently been extended resulting in an increase in the available discharge area.

A flow meter is used ot determine the discharge volume at the treatment plant. The largest daily discharge volume for the last review period was 10,875 m3/day. This will be reassessed upon receipt of this years annual report due July 2019.

---

3 The consent holder shall ensure that influent volumes of wastewater do not exceed the operating capacity of the treatment and irrigation systems.

Compliance Report:
Complies

Expansion of the plant to manage a predicted increase in population is underway. CP5 and CP6 have been extended, additional UV treatment capacity and an additional bioreactor have recently been installed.

---

4 The consent holder shall ensure that:

a. The discharge receives ultra-violet disinfection prior to irrigation.

b. The median concentration of faecal coliforms in the discharge shall not exceed 500 faecal colony forming units per 100 millilitre sample.

c. An alarm is fitted to the ultra-violet disinfection system which activates in the event that an inadequate dose is applied.

The ultra-violet disinfection system is calibrated and serviced annually.

Compliance Report:
Complies

All effluent is UV treated prior to discharge. The system is fitted with an alarm and is serviced and calibrated annually. The audit sample taken during my site visit reported 200CFU/100ml.

---

5 Alarm systems shall be installed at the treatment plant to warn of a power failure or a failure of any critical treatment system components. Standby power generation shall be available at all times the plant is operational.

Compliance Report:
Complies

Chris (Plant Manager) informed me alarms are installed on the system to warn of power failure. In the event of system failure Sicon and SDC employees are altered. A back up generator is available if required.

---

6 The discharge shall occur only via a spray irrigation system.

Compliance Report:
Complies

Discharge is via center pivot.

---

7 The application depth of the discharge shall not exceed 64 millimetres over any consecutive five (5) day period, and no single application shall exceed a depth of 20 millimetres.

Compliance Report:
Not monitored

This will be assessed upon receipt of the Annual Report in June. As previously discussed, it is recommended all pivots are bucket tested annually. This can be conducted by on site staff using an application available through Irrigation NZ if you do not wish to engage a consultant for this work.

---

8 The discharge shall not exceed a monthly average hydraulic loading rate of eight (8) millimetres per day.

Compliance Report:
Unable to determine compliance

The monthly average hydraulic loading rate was exceeded on a number of occasions during the previous reporting period. I understand this was due to a period of construction where some pivots were taken out of operation for short periods.

---

9 a. Prior to irrigation, the discharge shall be treated to ensure the following standards are met:

Parameter	Median*	95th Percentile*
Biochemical Oxygen Demand (BOD)	15	60
Suspended Solids	20	90
Total Nitrogen	7	35
Faecal Coliforms (cfu/100ml)	500	1,000

*All values are expressed in grams per cubic metre except faecal coliforms which are expressed colony-forming units per 100 millilitre sample.

b. In order to demonstrate compliance with Condition 9(a), samples of wastewater shall be taken from the pump chamber and analysed at least monthly.

Compliance Report:

Complies

The median and 95th percentile values are provided each year as part of the annual report and therefore will be assessed at this time. The audit sample results taken during my site visit showed the following
Results in (g/m^3) unless stated otherwise.
Total Suspended Solids = 8
Total Nitrogen = 3.1
Nitrate N + Nitrite N = 0.25
Total Kjedahl Nitrogen (TKN) - 2.9
Total Phosphorus = 5.7
Faecal Coliforms = 200 cfu/100ml

All audit sample results fall within the above standards.

Nb. There was an issue with incorrect sample bottles provided by Hills Laboratories, as a result BOD could not be tested on this occasion.

---

10 There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours.

Compliance Report:

Complies

Whilst on site I observed the discharge from CP5. The pivot appeared to be acheiving a good application and there was no ponding evident.

---

11 The discharge shall be managed to ensure that there shall be no discharge within 20 metres of any surface water body and the run-off of wastewater into any surface waterbody is prevented.

Compliance Report:
Complies

There are no waterways located within 20m of the discharge areas.

---

12 All stockwater races within the wastewater irrigation areas shown on Plan CRC153952D shall be piped or otherwise closed by 28 February 2017.

Compliance Report:
Complies

The stockwater race previously running through the center of the discharge field has been closed. A stockwater race remains next to the CP5 pivot, however a large buffer is currently in place as is a boundary hedge seperating the discharge area from the stockwater race. This has been discussed with senior officers and the decision made this stockwater race may remain, providing there continues to be a buffer of at least 20m and the buffer shelterbelt remains and is well maintained to ensure there is no risk of spray drift entering the race.

---

13 The discharge of treated wastewater shall only occur within the area labelled "Discharge Area A, B and C" on Plan CRC153952B according to the following setback distances:

a. Discharge Area A" no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *"Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land" or its successor, with wastewater spray irrigation set back by:*

    i. *No less than 40 metres from any site boundary where complying shelter is established*; or*

ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.*

b. Within “Discharge Area B” no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *“Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land” or its successor, with wastewater spray irrigation set back by:*

   i. *No less than 15 metres from any site boundary where complying shelter is established*; or*

   ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.*

c. Within “Discharge Area C” no wastewater spray irrigation shall commence within 10 metres of any site boundaries.

Compliance Report:

Complies

The majority of shelterbelts are now over 3m in height and generally well established. Ongoing replanting and maintenance of any 'gaps' in the shelterbelts should be carried out in the near future. The required setback distances are being complied with.

---

14 a. The consent holder shall undertake shelter planting as necessary to ensure that the effects of spray and aerosols from wastewater irrigation are not offensive or objectionable beyond the site boundary.* Note Wastewater spray irrigation is also precluded from occurring on Pt Lot 2 DP 82068 (as per the conditions of the designation)

b. Effluent shall not be applied:

   i. Onto land within 50 metres of any active community used for water extraction not owned by the holder of this consent and any community supply protection zones;

   ii. Onto land within 20 metres of any surface waterway;

   iii. Onto ground with no vegetative cover;

iv. Onto ground where surface ponding is occurring; and

v. There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours.

c. The consent holder shall prepare a Landscape Plan and shall provide it to the Canterbury Regional Council, Attn: RMA Compliance and Enforcement Manager prior to the commencement of planting confirming that the planting is consistent with the requirements of the Department of Public Health Public Health Services 1992 Guideline or its successor. The Landscape Plan shall include, but not be limited to, the following information:

i. The location and extent of each area of shelter planting.

ii. The species to be planted and the anticipated height of each plant following establishment.

iii. The minimum plant size and spacing required at planting to achieve the minimum plant height defined in clause (b) of this condition prior to the commencement of wastewater spray irrigation.

d. Once established the landscaping shall be maintained for the duration of the exercise of the consent, with any dead, dying or diseased plants being replaced within one growing season within plants of a similar species and in accordance with the planting specified in the Landscape Plan required under clause (c).

Compliance Report:

Complies

The majority of the shelterbelts on this property are well established and provide an adequate buffer to help ensure odour and aerosols associated with the discharge are mitigated against.

*Please see notes under previous condition re maintenance and replanting. There are no drinking water protection zones within 50m of the discharge area. The center pivots are set up to ensure no discharge occurs within 20m of any surface waterway.

Whilst on site I observed the discharge from CP5. On site we discussed the importance of ensuring sufficient vegetative cover is in place prior to using these areas to discharge effluent. Condition 14(b)(iii) specifically states effluent cannot be discharged onto ground with NO vegetative cover. There was some vegetative cover in place in this area, and therefore the discharge is considered 'compliant' with this condition. However, in future I recommend awaiting a greater density of vegetation cover prior to discharge in order to achieve the best possible treatment.

---

15 a. The discharge area shall be fenced to prevent stock, vehicle and public access.

b. At either end of the discharge area along Burnham School Road an easy visible sign should state " Potential Health Risks from Aerosolised treated sewage in this area".

Compliance Report:
Complies

The discharge area is well fenced. The require signage is in place at either end of the discharge area.

---

16 A notice shall be erected and maintained at all entrances to the site. This notice shall be legible at a distance of five (5) metres and shall inform the public of the nature of the activities occurring at the site, and that the disposal or waste by any other person is prohibited.

Compliance Report:
Complies

---

17 The discharge shall be managed to ensure that:

a. Aerosols and spray-drift arising from the discharge do not cause offensive or objectionable effects beyond the boundary of the discharge area.

b. Any odour resulting from spray irrigation of wastewater shall not result in offensive or objectionable effects on the environment beyond the boundary of the irrigated area.

Compliance Report:
Complies

At the time of my visit there was no odour or aerosols noted beyond the property boundary. I note there had been odour complaints in received in the past. Due to the location of these complaints it is possible these were due to the Robson's Environmental discharge occurring on the adjacent farm land. Environment Canterbury have not received any further complaints since this activity ceased.

---

18 a. All parts of the discharge area receiving wastewater shall be operated as a cut and carry operation.

b. There shall be no harvesting of crops within 48 hours of any wastewater irrigation.

c. All pasture harvested from the irrigation areas shall be removed for off-site disposal.

Compliance Report:
Complies

A cut and carry pasture management system is operated at this site. Irrigation of blocks to be cut ceases at least 48 hours prior to harvesting. Samples are taken after the rest period.

---

19 A Management Plan shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, at least two (2) months prior to the exercise of this consent. The Management Plan shall:

a. Set out how the activity authorised by this consent shall be operated to enable compliance with the consent conditions.

b. Be maintained at all times and any changes to the Management Plan shall be submitted to the Canterbury Regional Council prior to those changes taking effect.

Compliance Report:
Unable to determine compliance

This condition has been monitored n previous inspections. I understand there has been no change to the formal management plan, but that Stantec have provided further information following the completion of Stage 3. I recommend incorporating the Stantec information with the Management Plan and producing an updated management plan to include the recent upgrades.

---

20 The Management Plan referred to in Condition 19 shall include, but not be limited to, the following:

a. The method of sampling chemicals, quantities of wastewater and frequency of sampling throughout the operation.

b. The testing and calibration of all systems including backup generator, telemetry, and flow meters.

c. Sub-condition cancelled.

d. The monthly monitoring programme of the onsite bores identified on Plan CRC153952C.

21 The discharge shall be sampled from the irrigation pump chamber once per month and analysed for the following:

a. Biochemical Oxygen Demand.

b. Total Suspended Solids.

c. Total Kjeldahl Nitrogen.

d. Ammoniacal Nitrogen.

e. Faecal coliforms.

Compliance Report:
Not monitored

Chis confirmed the required samples are taken monthly and analysed for the above contaminants. This will be formally assessed upon receipt of the annual report in June 2019.

---

22 Daily records shall be kept of the following:

a. The volume of wastewater applied to land.

b. The irrigation zone over which the discharge is applied.

c. The depth of the application of wastewater.

Compliance Report:
Not monitored

These records are provided as part of the annual report due in June 2019. Compliance with this condition will be monitored at this time.

---

23 Monthly records shall be kept of the following:

a. The total volume of wastewater applied.

b. The total depth of wastewater applied.

c. The average effluent hydraulic loading rate.

d. The nitrogen loading rate (expressed as kilograms of nitrogen per hectare).

e. The mean dry weight of pasture removed from the site.

Compliance Report:
Not monitored

These records are provided as part of the annual report due in June 2019. Compliance with this condition will be monitored at this time.

---

24 Prior to the exercise of the consent, the consent holder shall review and update as necessary the 'Excursion Response Plans' (ERP) included in the application to be consistent with the conditions of consent, and submit a copy of the revised ERP to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager. Thereafter the ERP shall be maintained at all times and any changes to the ERP shall be submitted to the Canterbury Regional Council prior to those changes taking effect.

Compliance Report:
Complies

An Excursion Response Plan was provided in 2016 (int ref #C16C/15733)

---

25 For the purposes of monitoring the effects of the discharge on groundwater quality, in reference to the bores identified in condition (20):

a. The consent holder shall establish and maintain a minimum of three (3) on-site monitoring bores located down-gradient of the irrigation area and two (2) on-site monitoring bores located up-gradient of the irrigation area for the duration of this consent.

b. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall have screened sections extending from two (2) metres below the lowest water level to one (1) metre above the highest water level.

c. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall be sampled and analysed at least monthly for nitrate nitrogen and Faecal coliform:

d. In the event that the:

   i. concentration of nitrate nitrogen in any of the groundwater samples collected from the down-gradient monitoring bores referred to in clause (a) of this condition exceeds eight (8) milligrams per litre and is at least 30 per cent greater than the nitrate nitrogen concentration in the up-gradient bores also referred to in clause (a) of this condition; or

   ii. Faecal coliforms exceeds 50 coliform forming units (cfu)/ per 100 millilitres in any of the monitoring bores established in accordance with clause (a) of this condition;

Then the consent holder shall follow the response procedure outlined in the Excursion Response Plan.

Compliance Report:

Unable to determine compliance

A minimum of 2 upstream sampling bores and 3 down-stream sampling bores are established and maintained as per condition 25a. Based on the records provided, the ERP has been initiated as required.

Monthly sampling to determine the concentration of nitrate nitrogen and Faecal Coliforms has been conducted. The nitrate levels in down gradient bores exceeded 8 mg/L on a number of occasions between June 2017 to October 18. Previously, Amit explained there is concern other activities up gradient of The Pines may be impacting on these results, due to poor coverage of upgradient sampling bores. Amit informed me a bore has been drilled on the north-west corner of the property in an attempt to discount other potential influencers. No sampling has taken place as of yet.

ECan was noted of the ERP initiation on several occasions late 2018.

There is potential the unauthorised discharges by Robson's Environmental on SDC land adjacent to several of these monitoring bores may have elevated the down gradient contaminant levels. Amit informed me there have still been some high nitrate readings from time to time, but none that would trigger the ERP requirements. Monitoring records for Dec 18 to present have been requested.

---

26 For the purposes of monitoring the effects of the discharge on soils:

a. Samples of soil shall be collected twice annually from the land beneath each centre pivot irrigator or k-line irrigation area that has received treated wastewater irrigation in the previous six (6) months.

b. Sampling shall occur between a depth of zero (0) and 50 millimetres.

c. A minimum of four (4) samples shall be taken from each area sampled and all samples from the wastewater irrigation site shall be combined into a single composite sample and be analysed for the following:

   i. Total cadmium

   ii. Total chromium

   iii. Total copper

   iv. Total lead

v. Total nickel

vi. Total zinc

vii. Total nitrogen

viii. Total mercury

ix. Total arsenic

Compliance Report:
Not monitored

This condition will be monitored upon receipt of the annual report in June 2019.

---

27 a. If any of the results of any of the analysed samples in accordance with condition 26 exceed the thresholds specified in clause (b) of this condition the consent holder shall:

i. Cease wastewater irrigation over that irrigation area.

ii. Advise the Canterbury Regional Council within ten (10) days of the receipt of the results, and outline the steps taken to address elevated soil concentrations, including any remediation or mitigation measures.

iii. Not recommence wastewater irrigation over that irrigation area until further sampling demonstrates to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, compliance with the thresholds specified in clause (b) of this condition.

b.

c.

Trace Element	Limit (milligrams per kilogram) dry weight
Total Cadmium	1
Total Chromium	600
Total Copper	100
Total Lead	300
Total Nickel	60
Total Zinc Total Mercury	300 1
Total Arsenic	20

Compliance Report:
Not monitored

28 All samples required under this consent shall be taken by a suitably qualified and experienced person, and shall be analysed using methods approved by the American Public Health Association or the American Society for the Testing of Materials by a laboratory that is accredited for that method of analysis by International Accreditation New Zealand (IANZ) or by an organisation with a mutual agreement with IANZ.

29 The results of all samples taken under this consent shall be provided to the Canterbury Regional Council within ten (10) working days of receipt of the samples.

30 The consent holder shall provide the Canterbury Regional Council with an Annual Monitoring Report each year commencing 12 months from the date of the exercise of this consent. The Annual Monitoring Report shall include, but not be limited to:

a. Monthly monitoring records.

b. All sampling results required under the conditions of consent.

c. Annual average nitrogen loading rate.

d. A record of any complaints from members of the public and actions taken.

e. Status of compliance with consent conditions.

f. Reasons for any non-compliances and actions taken or planned to prevent re-occurrences.

This report shall then become the formal record of results for that year.

Compliance Report:

Complies

The 2017-18 Annual Report was provided on the 6th August 2018. The next annual report is due end of July 2019.

31 a. Prior to the construction of the Pines Wastewater Treatment Facility, design plans shall be certified by a Chartered Professional Engineer (CPEng) with at least five (5) years experience in the design and construction of wastewater treatment systems to confirm that the system has been suitably designed to achieve or better the values set out in Condition 10(a).

b. A copy of the certified design plans shall be submitted to the Canterbury Regional Council, Attention: Environmental Compliance Manager, at least one month prior to construction.

Compliance Report:
Not monitored

---

32 a. Prior to the exercise of this consent, the consent holder shall establish a reticulated water supply which provides sufficient water to cover the property holders domestic needs to the properties located within the area bound by Brookside Road, Ellesmere Junction Road and Edwards Road.

b. The consent holder shall maintain the reticulated supply for the duration of this consent and ensure the quality of water supplied complies with New Zealand Drinking Water Standards 2008 criteria.

Compliance Report:
Complies

Based on the maps provided, the reticulated supply runs north to south down Burnham Road up to and including property 99. The full extent of Ellesmere Junction Road, Brookside Road and Edwards Road as required have a reticulated supply available to them. The maps are available at (C19C/21968).

---

33 a. In the event of any disturbance of Koiwi Tangata (human bones) or taonga (treasured artefacts), during the construction or installation of the treatment and disposal facilities, the consent holder shall immediately:

i. Cease earthmoving operations in the affected area

ii. Mark off the affected area until earthmoving operations recommence

iii. Advise the Canterbury Regional Council of the disturbance

iv. Advise the Upoko Runanga of Te Taumutu Runanga, or their representative (contact information can be obtained from the Canterbury Regional Council), and the New Zealand Historic Places Trust, of the disturbance.

b. Earthmoving equipment operations shall not recommence until either;

i. the consent holder provides a certificate in writing to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, signed by Upoko Runanga of Taumutu, or their

representative(s), stating that appropriate action has been undertaken in relation to the discovered culturally sensitive material; or

ii. after five (5) working days after advising the Taumutu Runanga, a certificate signed by an archaeologist (i.e., a person with a post graduate degree in archaeology, and who is a member of the New Zealand Archaeological Association) is provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that states that in the archaeologist's opinion appropriate action has been undertaken in relation to the discovered culturally sensitive material. That certificate shall detail the action that has been undertaken by the consent holder. A copy of the archaeologist's qualifications shall also be provided with any such certificate.

---

34 The lapsing provisions of Section 125 of the Resource Management Act 1991 shall not apply to this consent until 31 March 2030.

---

35 The Canterbury Regional Council may, once per year, on any of the last five (5) working days of March or September serve notice of its intention to review the conditions of this consent for the purposes of either of the following:

a. Dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.

b. Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

---

36 When discharging wastewater to land adjacent to the Plan Change land, the consent holder shall ensure that:

a. The discharge shall be in an aerobic state.

b. The dissolved oxygen concentration shall not be less that a trigger level of 0.5 grams per cubic metre.

c. The dissolved oxygen concentration in the discharge shall be continuously monitored and an alarm fitted that activates in the event that the dissolved oxygen concentration is less than the trigger level in clause (b) of this condition.

d. The dissolved oxygen monitoring device shall be calibrated and serviced annually.

Compliance Report:
Complies

Based on the information provided in the annual report DO levels do not exceed the consented trigger limit of 0.5 grams per cubic meter. Do levels are continuously monitored at the site. According to Chris, the DO meter is calibrated and service annually.

---

37 The requirements of Conditions 36(c) and 36(d) shall be undertaken by the consent holder for a minimum of at least two (2) years from the date of commencement of spray irrigation of wastewater to land in accordance with this consent.

---

38 The requirements of Conditions 36(c) and 36(d) shall no longer apply upon provision of a certificate signed by the person responsible for designing the wastewater irrigation system, or by a chartered Professional Engineer (CPEng), to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, certifying that;

a. dissolved oxygen in the discharge has been continuously monitored for at least two (2) years; and

b. the minimum level of dissolved oxygen concentration specified in Condition 36(b) has been continuously met or exceeded during that two (2) year period.

---

39 If the minimum level of dissolved oxygen concentration specified in Condition 36(b) is breached, or the median concentration of faecal coliforms is greater than 500 colony forming units per 100 millilitre sample, then the following provisions shall apply:

a. Any discharge of treated wastewater to land adjacent to the Plan Change land shall be setback no less that 200 metres from the common boundary as shown on Plan CRC101109.1C when the winds of any strength are from 170°N to 310°N; provided that

b. When the winds are not from 170°N to 310°N any discharge of treated wastewater shall comply with the setback distances prescribed by Condition 40.

Compliance Report:
Complies

CP5 is fitted with an alarm in the even of low DO within the CP5 prohibited zone. Further to this the pivot is programmed to cease the discharge while it moves outside of the specified zone. The required separation distance from the residential land boundary of >200 m is adhered to. E.Coli sampling results provided as part of the annual report show results of less than 500CFU/100ml sample. The pivots are fitted with valves and actuators to allow the outer sprinklers to be shut off as the pivot approaches the property boundary's associated with Plan Change 8. I am told wind direction is closely monitored to ensure compliance with Condition 39(b).

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40 In respect of shelter belt planting:

a. The consent holder shall establish a shelter belt comprising three rows of closely planted evergreen trees along the common boundary defined under Condition 39(a).

b. No discharge of treated wastewater to land shall occur within 150 metres of that common boundary until;

   i. the trees referred to in Condition 40(a) have reached a consistent minimum height of three (3) metres and have developed into a dense continuous shelter belt without gaps; and

   ii. the consent holder has demonstrated to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that the boundary plantings comply with Condition 40(b)(i).

c. Following confirmation pursuant to condition 40(b)(ii), discharge of treated wastewater to land may occur up to 25 metres from the common boundary defined under Condition 39(a).

Compliance Report:

Complies

At present no discharge occurs within 150m of the common boundary. CP7 has been reprogrammed to ensure separation distances are maintained. The shelterbelts required by this condition have been planted along the internal boundary as required. Please ensure maintenance and replanting occurs as necessary to ensure a dense cover without gaps is maintained as per Condition 40(b)(i).

---

41 There shall be no end guns associated with the wastewater spray irrigation system located on Pt Lot 1 DP 65117 or Pt RS 33357, being that part of the land subject to this consent located north or Burnham School Road.

Compliance Report:

Complies

There are no end guns on pivots within these areas.

---

42 In the event of cessation of irrigation from the wastewater spray irrigation system for more than 24 hours on land adjacent to the Plan Change land, the consent holder shall not start up irrigation from the spray irrigation system within 200 metres of the common boundary defined under Condition 39(a).

---

43 No discharge of treated wastewater to land from a spray irrigation system shall occur within 150 metres of the common boundary defined under Condition 38(i) unless:

a. The spray nozzles are no more than two (2) metres above ground level.

b. The spray nozzles produce large consistent droplets such as produced by the Nelson R3000 brand or similar product.

c. The operating pressure at the spray irrigation nozzle does not exceed 103 kilopascals (kPA).

Compliance Report:

Complies

The centre pivot in this area is fitted with R3000 nozzles. Amit informed me they are designed to achieve a maximum pressure of 100kPa. The nozzles are within 2m of the ground level.

General comments

Date Inspected: 11 Dec 2018

Monitored By: Trinity White

Signature:

RMO II Monitoring & Compliance

General information

Canterbury Regional Council Obligations

Under Section 35 of the Resource Management Act 1991, the Canterbury Regional Council has a duty to monitor all resource consent exercised within its region, to make sure all the conditions are being complied with.

Monitoring Frequency

The frequency with which your consent is monitored will vary according to the type of activity your consent authorises, the conditions imposed and the extent to which you have complied with these conditions on previous visits. **If you fully comply with all conditions then frequency will reduce to the minimum set for the activity.**

Costs

It is the Council's policy to recover all actual and reasonable costs of compliance monitoring of resource consents.

From:	Cinnil Thomas
To:	Trinity White
Cc:	"Ian Shaw"; "Lisa Shaw"; Chris Salkeld; Rachel Tompkins; Leila Dadian
Subject:	Re: Pines WWTP Groundwater Bores - ERP Response
Date:	Friday, 2 November 2018 9:07:41 AM

Dear Trinity,

We have received Test Results for the monitoring bores at Pines WWTP.

- **Nitrate level:** BX23/0206 results are at 9.2mg/L for nitrate which is > 8mg/L

Our intention is to monitor Pines bores very closely and activate the ERP

I have Ccéd our EHO, Contract engineer, OMC and WQO in this correspondence.

Regs

Cinnil Thomas

WATER SERVICES –TEAM LEADER | SERVICE DELIVERY - ASSETS

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Mobile: + 64 27 539 8316
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www.selwyn.getsready.net | m.selwyn.govt.nz

Environment Canterbury
Regional Council
Kaunihera Taiao ki Waitaha

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200 Tuam Street
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Christchurch 8140
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www.ecan.govt.nz

23 August 2019

Selwyn District Council
PO Box 90
Rolleston 7643

Dear Sir/Madam

Compliance Monitoring Report
Selwyn - Waihora Water Management Zone

Please find enclosed your compliance monitoring report for the following activity. It is important that you read this report carefully.

Consent number:	CRC153952
Location:	Burnham School Road, Main South Road & Brookside Road, ROLLESTON
Description:	To discharge contaminants to land and to air.

Overall consent compliance: **Non-compliance Action required**

This matter needs your immediate attention.

Complies = 25
Non-compliant No Action Required = 1
Non-compliant Action Required = 2
Unable to Determine Compliance = 2

Reason(s) for non-compliance:

Condition 9 - Exceedance of the 95th Percentile Faecal Coliform standards.

Condition 25 - The depth of the monitoring bores are not meeting the depth and screening requirements of this condition.

Please contact me on 027 578 0947 if you wish to discuss the actions needed to achieve compliance further.

Yours sincerely

Trinity White
RMO II Monitoring & Compliance

Doc No:	*C19C/136235*
Your Customer No:	*EC118692*
File No(s):	*CRC153952*

Consent No: ***CRC153952***

Description of consent	**Commencement Date**
To discharge contaminants to land and to air.	06 Mar 2015
Location	**Expiry Date**
Burnham School Road, Main South Road & Brookside Road, ROLLESTON	17 Dec 2045

Conditions & compliance

1 The discharge shall be only:

a. Treated wastewater originating from the Pines Wastewater Treatment Facility located at Lot 1 DP 309881, Burnham School Road, Burnham as shown on Plan CRC153952A; and

b. Odour and aerosols associated with the spray irrigation of treated wastewater.

Compliance Report:

Complies

The discharge is only wastewater originating from the treatment facility and associated odour and aerosols.

2 The discharge shall only occur within Wastewater Discharge Area A, B and C shown on Plan CRC153952B, and bound by Topo50 map references:

a. Topo50 BX23 459 672, BX23 472 699, BX23 467 708 and BX23 451 699; and

b. Topo50 BX23 453 700, BX23 472 710, BX23 468 717, BX23 454 710, BX23 455 709, BX23 449 716, BX23 450 705 and BX23 451 705.

c. The total combined volume of treated wastewater discharged under this consent and CRC131423 shall not exceed 25,614 cubic metres per day over the wastewater irrigation areas shown on Plan CRC153952B.

d. For the purposes of compliance with this condition the consent holder shall operate a flow meter which continuously monitors the volume of wastewater discharged to the irrigation area.

Compliance Report:

Complies

The maximum discharge occurred on the 13th of February 2019, The volume was 13868.3m^3

3 The consent holder shall ensure that influent volumes of wastewater do not exceed the operating capacity of the treatment and irrigation systems.

Compliance Report:
Complies

The maximum influent volume for the reporting period was 10543.3m^3 on the 2nd of June 2019.

Capacity is reported in Population Equivalent (PE) and is based on 220L/person/day. Whilst on site I was informed the liquid stream is currently 40K PE/day and the solids stream is currently 30k PE/day. I was informed by Amit upgrades to the plant due for completion September 2021 will increase the capacity to 45-50K PE.

Solids Stream
Sludge Digester = Unknown. Please confirm.
Bioreactor x 3 @ 15K each = 45K
Solids Handling Centrifuge x 2 @ 15K = 30K (nb. more capacity can be built in by running more than 40hrs)
Solar Drying Beds x 2 @ 15K each = 30K.

Nb. Whilst on site I was informed the extra capacity in the bioreactor is reducing dependency on the sludge digester.

Liquid Stream
Inlet Works X 1 @ 60K = 60K
UV Disinfection x 2 @ 30K each = 60K
Clarifier x 2 @ 20K each = 40K

Stantec have reported the following operating capacities for Pines III. As seen below, based on the information from Stantec the maximum influent volume does not exceed the operating capacity.

The design capacity for the Pines III WWTP is 45,000PE. However, some civil works, such as the inlet works channels, are designed for the future site layout for 60,000 PE. The table below summarises the design capacity to be provided for Pines III WWTP.

Table 3-3: Process Unit Design Capacity

Component	Civil Works	Mechanical Supply	Comments
Inlet Screens	60,000 PE	45,000PE	
Grit Removal	60,000 PE	60,000PE	
Bioreactors	60,000 PE	45,000 PE	15,000 PE each
Clarifiers	60,000 PE	60,000 PE	Construction of the third bioreactor increased the capacity of the existing clarifiers
UV Disinfection Channels	60,000 PE	60,000 PE	

Component	Civil Works	Mechanical Supply	Comments
Irrigation Pump Station wet well	60,000 PE	45,000 PE	
Centre Pivot Irrigators	84,000 PE	61,600 PE	Staged development
Dewatering Centrifuges	60,000 PE	60,000 PE	
Solar Drying Halls	40,000 PE	40,000 PE	July 2019: under procurement to increase capacity to 58,000 PE

---

4 The consent holder shall ensure that:

a. The discharge receives ultra-violet disinfection prior to irrigation.

b. The median concentration of faecal coliforms in the discharge shall not exceed 500 faecal colony forming units per 100 millilitre sample.

c. An alarm is fitted to the ultra-violet disinfection system which activates in the event that an inadequate dose is applied.

The ultra-violet disinfection system is calibrated and serviced annually.

Compliance Report:
Complies

a. The discharge receives UV disinfection prior to irrigation.
b. The highest monthly median Faecal Coliform sample results were 370 cfu/100ml in November 2018.
c. The UV disinfection system is fitted with an alarm system.

---

5 Alarm systems shall be installed at the treatment plant to warn of a power failure or a failure of any critical treatment system components. Standby power generation shall be available at all times the plant is operational.

Compliance Report:
Complies

During my visit I was informed by the plant manager Chris that a number of alarms are installed to warn of power failure. These alarms are linked to various employees who are alerted in the event of power and/or equipment failure. A standby generator is available.

---

6 The discharge shall occur only via a spray irrigation system.

Compliance Report:
Complies

The discharge occurs via center pivots.

---

7 The application depth of the discharge shall not exceed 64 millimetres over any consecutive five (5) day period, and no single application shall exceed a depth of 20 millimetres.

Compliance Report:

Complies

Based on the information supplied, the maximum daily application depth of 20mm and 5-day period have not been exceeded.

Please note, the manner in which the application depth is being reported is not correct. Please see the example below.

26 Jan 2019 - CP3

Reported application depth of 6.6mm on this day, when the maximum application depth was in fact 19.73mm.

Daily Runtime = 1201 minutes
Time Taken to Complete Revolution = 546 minutes
1201 / 546 = 2.2 revolutions completed on this day

Total Volume Discharged = 1818.3m^3
1818.3m^3 / 2.2 revolutions = 826.36m^3 discharged per revolution

Total Discharge Area = 125,664m^2
826.36m^3 / 125,664m^2 = 0.0066m x 1000 = 6.57mm

Therefore, the application depth is as follows:
1 Revolution = 6.57mm
2 Revolutions = 13.15mm
3 Revolutions = 19.73mm

Daily Volume (m3)	Daily Run Time (Minutes)	Daily Application Depth	Number of Revolutions	Volume dishcarge per Revolution (m3)	Application Depth for 1 Rev (mm)	No of Rev * App Depth for 1 Rev *mm)	Discharge Area (m2)
1818.3	1201.0	1514.0	2.2	826.6	6.6	19.7	125664

---

8 The discharge shall not exceed a monthly average hydraulic loading rate of eight (8) millimetres per day.

Compliance Report:

Complies

The highest monthly average hydraulic loading rate was 7.19mm for CP4 in January 2019.

---

9 a. Prior to irrigation, the discharge shall be treated to ensure the following standards are met:

Parameter	Median*	95th Percentile*
Biochemical Oxygen Demand (BOD)	15	60
Suspended Solids	20	90
Total Nitrogen	7	35
Faecal Coliforms (cfu/100ml)	500	1,000

*All values are expressed in grams per cubic metre except faecal coliforms which are expressed colony-forming units per 100 millilitre sample.

b. In order to demonstrate compliance with Condition 9(a), samples of wastewater shall be taken from the pump chamber and analysed at least monthly.

Compliance Report:

Non-compliance Action required

Weekly samples are taken from reported on in the Annual Report. The annual report (Appendix D) shows the 95th Percentile ecoli to be 2380 cfu/100ml. This is non-compliant with the 95th Percentile limit of 1,000 cfu/100ml. The following information has been provided in response to this non-compliance.

SDC have identified stagnation of the water in the sampling tap extension pipe as the primary cause for these exceedances. Since there is no residual disinfection, there is likelihood of FC growth in the pipe and reflected in some samples. Council has found the purging of the tap to be inadequate and believe the location and geometry of the sample point was not a true representation of the water discharged from the treated water tank. In response, SDC have changed the location of the tap and brought it closer to the discharge pumps. Additionally, there is a maintenance schedule for the wet well to keep it in good condition and I understand improvements have been made to discourage the algal growth.

I note since the new sampling location was installed in March, that the FC levels have not been above 1,000 cfu/100ml since this time. I have discussed the grading of this condition with a Technical Lead as Council has undertaken actions to try to identify and eliminate the cause of these exceedances. However, considering there is only 3 months data (March - July) to test the hypothesis that the high results are due to stagnation, the action required in response to this non-compliance is to continue to monitor, to confirm any issues have been adequately addressed. This non-compliance will be considered to be resolved once 1 year of data showing no exceedances is available.

Audit sample results - 11 June 2019
BOD 5g O2/m3
SS 5g/m3
TN 5.3 g/m3
FC 52 cfu/100mL
TP 0.88g/m3
TKN 2.2g/m3
Nitrate-N + Nitrite-N 3.1g/m3

10 There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours.

Compliance Report:

Complies

Whilst on site I observed the discharge from CP7. No ponding was evident within the grassed discharge area, however I did note wastewater ponding within the pivot ruts. As seen in the photo below, the ponding was quite deep. I was informed these ruts were last filled in approximately 3-4 years ago. As expected, the pivot ruts are quite compacted and do not contain any grass medium, meaning little treatment is being provided to wastewater ponding in these areas. I recommend filling these ruts with a gravel medium on a more frequent basis to allow for some treatment to be provided, particularly considering these areas are prone to ponding of wastewater. Whilst not best practice, I believe the ponding is unlikely to have remained beyond 48 hours, and therefore have graded this condition as compliant.

You will also note in the photo one of the hoses had a leak resulting in an uneven application. Please ensure the pivots are regularly checked while in operation.

11 The discharge shall be managed to ensure that there shall be no discharge within 20 metres of any surface water body and the run-off of wastewater into any surface waterbody is prevented.

Compliance Report:
Complies

12 All stockwater races within the wastewater irrigation areas shown on Plan CRC153952D shall be piped or otherwise closed by 28 February 2017.

Compliance Report:
Unable to determine compliance

The stock water race running through the centre of the discharge area has been closed. One stock water race remains adjacent to the discharge are covered by CP5. A buffer of greater than 20m is currently in place, furthermore there is a boundary hedge between the discharge area and the stock water race. The race is just within the area on Plan CRC153952D but outside of the 'wastewater irrigation area' as defined by Plan CRC153952B. After discussing this with a senior officer, I suggest that the race may remain, providing there continues to be a buffer of at least 20m and the boundary shelterbelt remains and is well maintained to ensure no spray drift enters the race.

---

13 The discharge of treated wastewater shall only occur within the area labelled “Discharge Area A, B and C” on Plan CRC153952B according to the following setback distances:

a. Discharge Area A” no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *“Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land” or its successor, with wastewater spray irrigation set back by:*

   i. *No less than 40 metres from any site boundary where complying shelter is established*; or*

   ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.*

b. Within “Discharge Area B” no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *“Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land” or its successor, with wastewater spray irrigation set back by:*

   i. *No less than 15 metres from any site boundary where complying shelter is established*; or*

   ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.*

c. Within “Discharge Area C” no wastewater spray irrigation shall commence within 10 metres of any site boundaries.

Compliance Report:

Unable to determine compliance

Whilst on site I viewed the boundary hedge within Discharge Area B. It was difficult to assess compliance with the various set back distances due to the large scale of the discharge area and number of hedges. However, I did not some areas where the boundary hedge was missing trees. I recommend Sicon conduct an audit into the height and density of planting for all of the shelter belts detailed under this condition to ensure compliance is achieved.

14

a. The consent holder shall undertake shelter planting as necessary to ensure that the effects of spray and aerosols from wastewater irrigation are not offensive or objectionable beyond the site boundary.* Note Wastewater spray irrigation is also precluded from occurring on Pt Lot 2 DP 82068 (as per the conditions of the designation)

b. Effluent shall not be applied:

    i. Onto land within 50 metres of any active community used for water extraction not owned by the holder of this consent and any community supply protection zones;

    ii. Onto land within 20 metres of any surface waterway;

    iii. Onto ground with no vegetative cover;

    iv. Onto ground where surface ponding is occurring; and

    v. There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours.

c. The consent holder shall prepare a Landscape Plan and shall provide it to the Canterbury Regional Council, Attn: RMA Compliance and Enforcement Manager prior to the commencement of planting confirming that the planting is consistent with the requirements of the Department of Public Health Public Health Services 1992 Guideline or its successor. The Landscape Plan shall include, but not be limited to, the following information:

    i. The location and extent of each area of shelter planting.

    ii. The species to be planted and the anticipated height of each plant following establishment.

    iii. The minimum plant size and spacing required at planting to achieve the minimum plant height defined in clause (b) of this condition prior to the commencement of wastewater spray irrigation.

d. Once established the landscaping shall be maintained for the duration of the exercise of the consent, with any dead, dying or diseased plants being replaced within one growing season within plants of a similar species and in accordance with the planting specified in the Landscape Plan required under clause (c).

Compliance Report:

Not monitored

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15 a. The discharge area shall be fenced to prevent stock, vehicle and public access.

b. At either end of the discharge area along Burnham School Road an easy visible sign should state " Potential Health Risks from Aerosolised treated sewage in this area".

Compliance Report:
Complies

The discharge area is well fenced and the gates to each area locked. Signage with the required statement is present at either end of the discharge area.

---

16 A notice shall be erected and maintained at all entrances to the site. This notice shall be legible at a distance of five (5) metres and shall inform the public of the nature of the activities occurring at the site, and that the disposal or waste by any other person is prohibited.

Compliance Report:
Complies

---

17 The discharge shall be managed to ensure that:

a. Aerosols and spray-drift arising from the discharge do not cause offensive or objectionable effects beyond the boundary of the discharge area.

b. Any odour resulting from spray irrigation of wastewater shall not result in offensive or objectionable effects on the environment beyond the boundary of the irrigated area.

Compliance Report:
Complies

Whilst on site I observed the discharge from CP5 there was no odour that would be considered offensive or objectionable as a result of the discharge at the time of my inspection. Following my visit I drove around the boundary of the discharge area and did not note any spray-drift or aerosols arising from this discharge.

---

18 a. All parts of the discharge area receiving wastewater shall be operated as a cut and carry operation.

b. There shall be no harvesting of crops within 48 hours of any wastewater irrigation.

c. All pasture harvested from the irrigation areas shall be removed for off-site disposal.

Compliance Report:
Complies

All parts of the discharge area currently receiving wastewater are operated as a cut and carry operation. All pasture harvested is removed off-site (generally to the neighbouring farm) for disposal.

---

19 A Management Plan shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, at least two (2) months prior to the exercise of this consent. The Management Plan shall:

a. Set out how the activity authorised by this consent shall be operated to enable compliance with the consent conditions.

b. Be maintained at all times and any changes to the Management Plan shall be submitted to the Canterbury Regional Council prior to those changes taking effect.

Compliance Report:
Complies

A revised Management Plan (30/07/2019) has been completed by Stantec and provided by SDC (INT REF# C19C/125351)

---

20 The Management Plan referred to in Condition 19 shall include, but not be limited to, the following:

a. The method of sampling chemicals, quantities of wastewater and frequency of sampling throughout the operation.

b. The testing and calibration of all systems including backup generator, telemetry, and flow meters.

c. Sub-condition cancelled.

d. The monthly monitoring programme of the onsite bores identified on Plan CRC153952C.

---

21 The discharge shall be sampled from the irrigation pump chamber once per month and analysed for the following:

a. Biochemical Oxygen Demand.

b. Total Suspended Solids.

c. Total Kjeldahl Nitrogen.

d. Ammoniacal Nitrogen.

e. Faecal coliforms.

Compliance Report:

Complies

Table 3.5 – Sampling Results for Compliance with Condition 9(a) and Provides the Median and the 95th Percentile Values

Month	FEC cfu/100 ml	NH_3 g/m³	NNN g/m³	TKN g/m³	TN g/m³	TP g/m³	ECO cfu/100 ml	T-BOD g/m³	pH	SS g/m³
Jul-18	110	0.478	3.9	2.9	6.7	3.1	43	5.5	7.5	8
Aug-18	2784	0.301	1.7	3.6	4.8	2.0	1892	8.2	7.6	11
Sep-18	980	0.835	1.3	3.2	4.5	3.6	423	5.8	7.5	11
Oct-18	1830	1.532	1.2	3.8	5.0	4.5	1288	6.0	7.7	8
Nov-18	570	0.193	0.7	2.2	2.9	5.7	325	4.8	7.5	6
Dec-18	86	0.984	1.9	3.2	5.1	6.3	40	4.8	7.8	7
Jan-19	278	0.125	2.7	2.0	4.7	3.4	154	3.0	7.8	5
Feb-19	348	0.190	3.9	7.8	6.3	5.1	73	3.3	7.8	7
Mar-19	406	0.114	4.8	2.4	7.2	5.0	86	5.2	7.6	7
Apr-19	1558	0.092	3.7	1.7	5.5	3.4	145	2.8	7.7	3
May-19	406	0.114	4.8	2.4	7.2	5.0	86	5.2	7.6	7

Audit sample results - 11 June 2019

BOD 5g O2/m3
SS 5g/m3
TN 5.3 g/m3
FC 52 cfu/100mL
TP 0.88g/m3
TKN 2.2g/m3
Nitrate-N + Nitrite-N 3.1g/m3

---

22 Daily records shall be kept of the following:

a. The volume of wastewater applied to land.

b. The irrigation zone over which the discharge is applied.

c. The depth of the application of wastewater.

Compliance Report:

Complies

Records have been provided showing the volume of wastewater applied to land as well as the discharge area. The depth of the application has also been provided, however the depth

assumes only one pivot revolution. Please report maximum application depths per day in future reporting.

For example, on the 26th of January 2019, the application depth for CP3 is quoted as being 6.6mm. However, the center pivot did 2.2 revolutions on this particular day, meaning in reality the pivot passed over part of the irrigation area 3 times. Therefore, the maximum irrigation application depth is infact 19.73mm not 6.6mm.

---

23 Monthly records shall be kept of the following:

a. The total volume of wastewater applied.

b. The total depth of wastewater applied.

c. The average effluent hydraulic loading rate.

d. The nitrogen loading rate (expressed as kilograms of nitrogen per hectare).

e. The mean dry weight of pasture removed from the site.

Compliance Report:
Complies

Monthly records are kept of each of the required parameters. However, as previously noted (condition 6, 7 and 8) there is an error in how the depth and hydraulic loading are being reported currently.

---

24 Prior to the exercise of the consent, the consent holder shall review and update as necessary the 'Excursion Response Plans' (ERP) included in the application to be consistent with the conditions of consent, and submit a copy of the revised ERP to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager. Thereafter the ERP shall be maintained at all times and any changes to the ERP shall be submitted to the Canterbury Regional Council prior to those changes taking effect.

Compliance Report:
Complies

An Excursion Response Plan was provided in 2016 (int ref #C16C/15733). A copy of the ERP can also be found within the recently revised Management Plan (C19C/125351).

---

25 For the purposes of monitoring the effects of the discharge on groundwater quality, in reference to the bores identified in condition (20):

a. The consent holder shall establish and maintain a minimum of three (3) on-site monitoring bores located down-gradient of the irrigation area and two (2) on-site

monitoring bores located up-gradient of the irrigation area for the duration of this consent.

b. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall have screened sections extending from two (2) metres below the lowest water level to one (1) metre above the highest water level.

c. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall be sampled and analysed at least monthly for nitrate nitrogen and Faecal coliform:

d. In the event that the:

   i. concentration of nitrate nitrogen in any of the groundwater samples collected from the down-gradient monitoring bores referred to in clause (a) of this condition exceeds eight (8) milligrams per litre and is at least 30 per cent greater than the nitrate nitrogen concentration in the up-gradient bores also referred to in clause (a) of this condition; or

   ii. Faecal coliforms exceeds 50 coliform forming units (cfu)/ per 100 millilitres in any of the monitoring bores established in accordance with clause (a) of this condition;

Then the consent holder shall follow the response procedure outlined in the Excursion Response Plan.

Compliance Report:
Non-compliance Action required

a. As discussed during our meeting with groundwater scientist Fouad Alkhaier on the 24.07.2019 the CP on the corner of Burnham Road and Brookside Road is not well covered by a suitable downgradient bore. Please look to install a down gradient bore to capture this pivot when upgrading the bores to achieve compliance with Condition 25(b).

b. The nearest groundwater level monitoring bore (M36/0465) is located 1km south of the wastewater disposal area. Groundwater this year is reported to be at a depth of -5m RGL. The minimum groundwater level is -9.6 RGL and maximum -3.3m RGL. Therefore, the groundwater monitoring bores noted in Condition 25(a) should be screened from 2m below the lowest water level (i.e approx 11.6m) and 1m above the highest water level (i.e. approx. 2.3m). I have detailed the depth and screened sections of each of the monitoring bores below. Based on this information, I do not believe these bores meet the requirement of Condition 25(b). As discussed during our meeting in July please stay in contact with Fouad and myself to ensure the new bores are screened to an appropriate depth and to discuss options for retaining some of the existing bores where appropriate to minimise the cost to Council.

Upgradient
BX23/0204 = 22.5m (screened 18m - 21m)

BX23/0205 = 24m (screened 21m - 24m)
BX23/0878 = 18m (screened 6m - 18m)

Downgradient
BX23/0206 = 13.9m (screened 8.9m - 13.9m)
BX23/0207 = 14m (screened 9m - 12m)
M36/7464 = 16.5m (screened 7.5m to 16.5m)
BX23/0208 = 17m (screened 11m to 14m)

c. Groundwater is sampled and analysed at least monthly for nitrate nitrogen and Faecal coliforms.

d.
i.) As seen in the table below, a number of nitrate exceedances occurred over the reporting period. Thank you for providing the follow up lab results. Having reviewed these reports, I consider further clarification is required regarding:
* The time frame for resampling
* The bores that should be resampled
* How this information is submitted to Environment Canterbury

Monitoring Well No.	Location	Well Depth in M	Lab no: 2005646	Lab no: 20019974	Lab no: 2038901	Lab no: 2043588	Lab no: 2054225	Lab no: 2072189	Lab no: 2083352	Lab no: 2072191	Lab no: 2115766	Lab no: 2072193	Lab no: 2148100	Lab no: 2072195	Lab no: 2180983
			26-Jun-18	24-Jul-18	28-Aug-18	5-Sep-18	25-Sep-18	30-Oct-18	20-Nov-18	18-Dec-18	29-Jan-19	28-Feb-19	25-Mar-19	29-Apr-19	23-May-19
M36/7463	Downstream		2.1	0.976	1.46		2.1	1.39	1.5	1.81	0.88	1.21	1.22	6.2	1.38
BX23/0204	Upstream	22.5	3.5	2.75	3	6.2	5.9	4.7	1.5	5.5		4.3	0.12	2.9	5.2
BX23/0205	Upstream	24	**3.3**	**3.86**	**4.1**	**6.3**	**7.1**	**6.5**	**6.7**	**5**		**4.4**	**6.5**	**9.1**	**9.4**
BX23/0878	Upstream (New-Feb 2019)	18										**23**	**24**	**22**	**23**
	Upstream average value		***3.4***	***3.305***	***3.55***	***6.25***	***6.5***	***5.6***				***10.57***	***10.21***	***11.33***	***12.53***
	30% of highest UG sample			5.018	5.33	8.19	9.23	8.45	8.71	6.5	0				
M36/7667	Downstream		1.88	3.32	1.51		3.9	0.98	2.9	4.5	1.43	1.33	1.14	1.39	1.31
M36/7668	Downstream		2.7	0.656	0.57		0.68	0.43	0.91	0.58	0.82	1.05	1.72	6.8	1.12
BX23/0206	Downstream	13.9	**6.1**	**6.52**	**8.4**	**8.7**	8.5	**9.2**	**8**	**8.5**	**8.5**	**5.2**	**8.6**	**5.3**	**0.74**
BX23/0207	Downstream	14	**5.1**	**1.53**	**0.81**		**2.7**	**4**	**2.9**	**4.3**	**2.4**	**0.22**	**1**	**0.62**	**0.74**
M36/20415	Downstream		3.3	3.96	4.3		3.9	3.1	3	3.2	3.5	5.9	6.4	10	7.1
M36/20416	Downstream		4.3	2.22	3.5		3.2	2.5	1.5	0.183	4.1	4	3.7	3.6	3.7
M36/7464	Downstream	16.5	**3**	**3.42**	**3.7**		**4**	**2.7**	**2.9**	**5.2**	**5.8**	**4.6**	**4.6**	**7.3**	**6.1**
BX23/0208	Downstream	17	**7.8**	**0.002**	**2.6**		**0.017**	**0.004**	**0.002**	**0.039**	**8.1**	**0.28**	**0.003**	**3.4**	**0.33**

ii) Based on the information provided faecal coliform concentrations did not exceed 50 cfu/100ml in any of the monitoring bores established. I.e. the bores listed above.

---

26 For the purposes of monitoring the effects of the discharge on soils:

a. Samples of soil shall be collected twice annually from the land beneath each centre pivot irrigator or k-line irrigation area that has received treated wastewater irrigation in the previous six (6) months.

b. Sampling shall occur between a depth of zero (0) and 50 millimetres.

c. A minimum of four (4) samples shall be taken from each area sampled and all samples from the wastewater irrigation site shall be combined into a single composite sample and be analysed for the following:

i. Total cadmium

ii. Total chromium

iii. Total copper

iv. Total lead

v. Total nickel

vi. Total zinc

vii. Total nitrogen

viii. Total mercury

ix. Total arsenic

Compliance Report:
Complies

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27 a. If any of the results of any of the analysed samples in accordance with condition 26 exceed the thresholds specified in clause (b) of this condition the consent holder shall:

i. Cease wastewater irrigation over that irrigation area.

ii. Advise the Canterbury Regional Council within ten (10) days of the receipt of the results, and outline the steps taken to address elevated soil concentrations, including any remediation or mitigation measures.

iii. Not recommence wastewater irrigation over that irrigation area until further sampling demonstrates to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, compliance with the thresholds specified in clause (b) of this condition.

b.

c.

Trace Element	Limit (milligrams per kilogram) dry weight
Total Cadmium	1
Total Chromium	600
Total Copper	100
Total Lead	300
Total Nickel	60
Total Zinc Total Mercury	300 1
Total Arsenic	20

28 All samples required under this consent shall be taken by a suitably qualified and experienced person, and shall be analysed using methods approved by the American Public Health Association or the American Society for the Testing of Materials by a laboratory that is accredited for that method of analysis by International Accreditation New Zealand (IANZ) or by an organisation with a mutual agreement with IANZ.

29 The results of all samples taken under this consent shall be provided to the Canterbury Regional Council within ten (10) working days of receipt of the samples.

Compliance Report:
Non-compliance No action required

Compliance with this condition was not met during the previous sampling year. As such a note was included in the Compliance Monitoring Report requesting these results are submitted to ecinfo@ecan.govt.nz as per this condition. I note these results have not been submitted within 10 days in accordance with this condition. Therefore this condition has been graded as non-compliant, no action required.

30 The consent holder shall provide the Canterbury Regional Council with an Annual Monitoring Report each year commencing 12 months from the date of the exercise of this consent. The Annual Monitoring Report shall include, but not be limited to:

a. Monthly monitoring records.

b. All sampling results required under the conditions of consent.

c. Annual average nitrogen loading rate.

d. A record of any complaints from members of the public and actions taken.

e. Status of compliance with consent conditions.

f. Reasons for any non-compliances and actions taken or planned to prevent re-occurrences.

This report shall then become the formal record of results for that year.

31 a. Prior to the construction of the Pines Wastewater Treatment Facility, design plans shall be certified by a Chartered Professional Engineer (CPEng) with at least five (5) years experience in the design and construction of wastewater

treatment systems to confirm that the system has been suitably designed to achieve or better the values set out in Condition 10(a).

b. A copy of the certified design plans shall be submitted to the Canterbury Regional Council, Attention: Environmental Compliance Manager, at least one month prior to construction.

---

32 a. Prior to the exercise of this consent, the consent holder shall establish a reticulated water supply which provides sufficient water to cover the property holders domestic needs to the properties located within the area bound by Brookside Road, Ellesmere Junction Road and Edwards Road.

b. The consent holder shall maintain the reticulated supply for the duration of this consent and ensure the quality of water supplied complies with New Zealand Drinking Water Standards 2008 criteria.

Compliance Report:
Complies

Based on the maps provided, the reticulated supply runs north to south down Burnham Road up to and including property 99. The full extent of Ellesmere Junction Road, Brookside Road and Edwards Road as required have a reticulated supply available to them. The maps are available at (C19C/21968).

---

33 a. In the event of any disturbance of Koiwi Tangata (human bones) or taonga (treasured artefacts), during the construction or installation of the treatment and disposal facilities, the consent holder shall immediately:

i. Cease earthmoving operations in the affected area

ii. Mark off the affected area until earthmoving operations recommence

iii. Advise the Canterbury Regional Council of the disturbance

iv. Advise the Upoko Runanga of Te Taumutu Runanga, or their representative (contact information can be obtained from the Canterbury Regional Council), and the New Zealand Historic Places Trust, of the disturbance.

b. Earthmoving equipment operations shall not recommence until either;

i. the consent holder provides a certificate in writing to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, signed by Upoko Runanga of Taumutu, or their

representative(s), stating that appropriate action has been undertaken in relation to the discovered culturally sensitive material; or

ii. after five (5) working days after advising the Taumutu Runanga, a certificate signed by an archaeologist (i.e., a person with a post graduate degree in archaeology, and who is a member of the New Zealand Archaeological Association) is provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that states that in the archaeologist's opinion appropriate action has been undertaken in relation to the discovered culturally sensitive material. That certificate shall detail the action that has been undertaken by the consent holder. A copy of the archaeologist's qualifications shall also be provided with any such certificate.

---

34 The lapsing provisions of Section 125 of the Resource Management Act 1991 shall not apply to this consent until 31 March 2030.

---

35 The Canterbury Regional Council may, once per year, on any of the last five (5) working days of March or September serve notice of its intention to review the conditions of this consent for the purposes of either of the following:

a. Dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.

b. Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

---

36 When discharging wastewater to land adjacent to the Plan Change land, the consent holder shall ensure that:

a. The discharge shall be in an aerobic state.

b. The dissolved oxygen concentration shall not be less that a trigger level of 0.5 grams per cubic metre.

c. The dissolved oxygen concentration in the discharge shall be continuously monitored and an alarm fitted that activates in the event that the dissolved oxygen concentration is less than the trigger level in clause (b) of this condition.

d. The dissolved oxygen monitoring device shall be calibrated and serviced annually.

Compliance Report:
Complies

Based on the information provided in the annual report DO levels do not exceed the consented trigger limit of 0.5 grams per cubic meter. Do levels are continuously monitored at the site. According to Chris, the DO meter is calibrated and service annually.

---

37 The requirements of Conditions 36(c) and 36(d) shall be undertaken by the consent holder for a minimum of at least two (2) years from the date of commencement of spray irrigation of wastewater to land in accordance with this consent.

---

38 The requirements of Conditions 36(c) and 36(d) shall no longer apply upon provision of a certificate signed by the person responsible for designing the wastewater irrigation system, or by a chartered Professional Engineer (CPEng), to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, certifying that;

a. dissolved oxygen in the discharge has been continuously monitored for at least two (2) years; and

b. the minimum level of dissolved oxygen concentration specified in Condition 36(b) has been continuously met or exceeded during that two (2) year period.

---

39 If the minimum level of dissolved oxygen concentration specified in Condition 36(b) is breached, or the median concentration of faecal coliforms is greater than 500 colony forming units per 100 millilitre sample, then the following provisions shall apply:

a. Any discharge of treated wastewater to land adjacent to the Plan Change land shall be setback no less that 200 metres from the common boundary as shown on Plan CRC101109.1C when the winds of any strength are from 170°N to 310°N; provided that

b. When the winds are not from 170°N to 310°N any discharge of treated wastewater shall comply with the setback distances prescribed by Condition 40.

Compliance Report:
Complies

CP5 is fitted with an alarm in the event of low DO within the CP5 prohibited zone. Further to this the pivot is programmed to cease the discharge while it moves outside of the specified zone. The required separation distance from the residential land boundary of >200 m is adhered to. E.Coli sampling results provided as part of the annual report show results of less than 500CFU/100ml sample. The pivots are fitted with valves and actuators to allow the outer sprinklers to be shut off as the pivot approaches the property boundary's associated with Plan

Change 8. I am told wind direction is closely monitored to ensure compliance with Condition 39(b).

---

40 In respect of shelter belt planting:

a. The consent holder shall establish a shelter belt comprising three rows of closely planted evergreen trees along the common boundary defined under Condition 39(a).

b. No discharge of treated wastewater to land shall occur within 150 metres of that common boundary until;

i. the trees referred to in Condition 40(a) have reached a consistent minimum height of three (3) metres and have developed into a dense continuous shelter belt without gaps; and

ii. the consent holder has demonstrated to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that the boundary plantings comply with Condition 40(b)(i).

c. Following confirmation pursuant to condition 40(b)(ii), discharge of treated wastewater to land may occur up to 25 metres from the common boundary defined under Condition 39(a).

---

41 There shall be no end guns associated with the wastewater spray irrigation system located on Pt Lot 1 DP 65117 or Pt RS 33357, being that part of the land subject to this consent located north or Burnham School Road.

Compliance Report:
Complies

There are no end guns on this pivot.

---

42 In the event of cessation of irrigation from the wastewater spray irrigation system for more than 24 hours on land adjacent to the Plan Change land, the consent holder shall not start up irrigation from the spray irrigation system within 200 metres of the common boundary defined under Condition 39(a).

---

43 No discharge of treated wastewater to land from a spray irrigation system shall occur within 150 metres of the common boundary defined under Condition 38(i) unless:

a. The spray nozzles are no more than two (2) metres above ground level.

b. The spray nozzles produce large consistent droplets such as produced by the Nelson R3000 brand or similar product.

c. The operating pressure at the spray irrigation nozzle does not exceed 103 kilopascals (kPA).

Compliance Report:

Complies

The centre pivot in this area is fitted with R3000 nozzles. Amit informed me they are designed to achieve a maximum pressure of 100kPa. The nozzles are within 2m of the ground level.

General comments

On the 11th of June 2019 I visited the The Pines WWTP. On site I met with Amit Chauhan (SDC) and Chris Salkeld (Sicon). Thank you both for assisting me with my visit.

If you have any queries regarding this compliance monitoring report or your resource consent, please feel free to contact me on 027 578 0947.

Date Inspected: 04 Jul 2019

Monitored By: Trinity White

Signature: _____

RMO II Monitoring & Compliance

General information

Canterbury Regional Council Obligations

Under Section 35 of the Resource Management Act 1991, the Canterbury Regional Council has a duty to monitor all resource consent exercised within its region, to make sure all the conditions are being complied with.

Monitoring Frequency

The frequency with which your consent is monitored will vary according to the type of activity your consent authorises, the conditions imposed and the extent to which you have complied with these

conditions on previous visits. **If you fully comply with all conditions then frequency will reduce to the minimum set for the activity.**

Costs

It is the Council's policy to recover all actual and reasonable costs of compliance monitoring of resource consents.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636
200 Tuam Street
PO Box 345
Christchurch 8140
E. ecinfo@ecan.govt.nz
www.ecan.govt.nz

12 February 2019

Selwyn District Council
PO Box 90
Rolleston 7643

Dear Sir/Madam

Compliance Monitoring Report
Selwyn - Waihora Water Management Zone

Please find enclosed your compliance monitoring report for the following activity. It is important that you read this report carefully.

Consent number:	CRC153952
Location:	Burnham School Road, Main South Road & Brookside Road, ROLLESTON
Description:	To discharge contaminants to land and to air.

Overall consent compliance: **Complies**

Thank you for complying with the resource consent conditions that have been monitored. If you continue to fully comply with all conditions then the frequency of monitoring will reduce to the minimum set for the activity.

Reminder(s)

- Please provide discharge records showing the monthly average hydraulic loading rate for each of the 7 pivots, so compliance can be reassessed prior to the release of this year's annual report.
- Can you please provide groundwater monitoring information for the period 1 November 2018 (i.e. following Robson's discharge ceasing to present.)

If you would like any further information regarding this report please do not hesitate to contact me.

Yours sincerely

Trinity White
RMO II Monitoring & Compliance

Consent No: ***CRC153952***

Description of consent	**Commencement Date**
To discharge contaminants to land and to air.	06 Mar 2015
Location	**Expiry Date**
Burnham School Road, Main South Road & Brookside Road, ROLLESTON	17 Dec 2045

Conditions & compliance

1 The discharge shall be only:

a. Treated wastewater originating from the Pines Wastewater Treatment Facility located at Lot 1 DP 309881, Burnham School Road, Burnham as shown on Plan CRC153952A; and

b. Odour and aerosols associated with the spray irrigation of treated wastewater.

Compliance Report:

Unable to determine compliance

At the time of my visit discharges were only treated wastewater originating from the Pines Wastewater Treatment Facility and odour/aerosols associated with this discharge.

Nb. On Friday 2nd of November 2018, SDC became aware of the discharge of animal effluent within the land parcel occupied by the Pines WWTP. Robson's environmental was responsible for the discharge, and investigations suggest permission was sought by the grazing leasee and not Selwyn District Council as the property owners. I understand, the discharge was not taking place within the Pines discharge areas, rather the adjacent farm land. An investigation into Robson's Environmental was carried out and the practice has now ceased.

2 The discharge shall only occur within Wastewater Discharge Area A, B and C shown on Plan CRC153952B, and bound by Topo50 map references:

a. Topo50 BX23 459 672, BX23 472 699, BX23 467 708 and BX23 451 699; and

b. Topo50 BX23 453 700, BX23 472 710, BX23 468 717, BX23 454 710, BX23 455 709, BX23 449 716, BX23 450 705 and BX23 451 705.

c. The total combined volume of treated wastewater discharged under this consent and CRC131423 shall not exceed 25,614 cubic metres per day over the wastewater irrigation areas shown on Plan CRC153952B.

d. For the purposes of compliance with this condition the consent holder shall operate a flow meter which continuously monitors the volume of wastewater discharged to the irrigation area.

Compliance Report:
Complies

Wastewater discharge is via center pivot. CP5 and CP6 have recently been extended resulting in an increase in the available discharge area.

A flow meter is used ot determine the discharge volume at the treatment plant. The largest daily discharge volume for the last review period was 10,875 m3/day. This will be reassessed upon receipt of this years annual report due July 2019.

---

3 The consent holder shall ensure that influent volumes of wastewater do not exceed the operating capacity of the treatment and irrigation systems.

Compliance Report:
Complies

Expansion of the plant to manage a predicted increase in population is underway. CP5 and CP6 have been extended, additional UV treatment capacity and an additional bioreactor have recently been installed.

---

4 The consent holder shall ensure that:

a. The discharge receives ultra-violet disinfection prior to irrigation.

b. The median concentration of faecal coliforms in the discharge shall not exceed 500 faecal colony forming units per 100 millilitre sample.

c. An alarm is fitted to the ultra-violet disinfection system which activates in the event that an inadequate dose is applied.

The ultra-violet disinfection system is calibrated and serviced annually.

Compliance Report:
Complies

All effluent is UV treated prior to discharge. The system is fitted with an alarm and is serviced and calibrated annually. The audit sample taken during my site visit reported 200CFU/100ml.

---

5 Alarm systems shall be installed at the treatment plant to warn of a power failure or a failure of any critical treatment system components. Standby power generation shall be available at all times the plant is operational.

Compliance Report:
Complies

Chris (Plant Manager) informed me alarms are installed on the system to warn of power failure. In the event of system failure Sicon and SDC employees are altered. A back up generator is available if required.

---

6 The discharge shall occur only via a spray irrigation system.

Compliance Report:
Complies

Discharge is via center pivot.

---

7 The application depth of the discharge shall not exceed 64 millimetres over any consecutive five (5) day period, and no single application shall exceed a depth of 20 millimetres.

Compliance Report:
Not monitored

This will be assessed upon receipt of the Annual Report in June. As previously discussed, it is recommended all pivots are bucket tested annually. This can be conducted by on site staff using an application available through Irrigation NZ if you do not wish to engage a consultant for this work.

---

8 The discharge shall not exceed a monthly average hydraulic loading rate of eight (8) millimetres per day.

Compliance Report:
Unable to determine compliance

The monthly average hydraulic loading rate was exceeded on a number of occasions during the previous reporting period. I understand this was due to a period of construction where some pivots were taken out of operation for short periods.

---

9 a. Prior to irrigation, the discharge shall be treated to ensure the following standards are met:

Parameter	Median*	95th Percentile*
Biochemical Oxygen Demand (BOD)	15	60
Suspended Solids	20	90
Total Nitrogen	7	35
Faecal Coliforms (cfu/100ml)	500	1,000

*All values are expressed in grams per cubic metre except faecal coliforms which are expressed colony-forming units per 100 millilitre sample.

b. In order to demonstrate compliance with Condition 9(a), samples of wastewater shall be taken from the pump chamber and analysed at least monthly.

Compliance Report:

Complies

The median and 95th percentile values are provided each year as part of the annual report and therefore will be assessed at this time. The audit sample results taken during my site visit showed the following
Results in (g/m^3) unless stated otherwise.
Total Suspended Solids = 8
Total Nitrogen = 3.1
Nitrate N + Nitrite N = 0.25
Total Kjedahl Nitrogen (TKN) - 2.9
Total Phosphorus = 5.7
Faecal Coliforms = 200 cfu/100ml

All audit sample results fall within the above standards.

Nb. There was an issue with incorrect sample bottles provided by Hills Laboratories, as a result BOD could not be tested on this occasion.

---

10 There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours.

Compliance Report:

Complies

Whilst on site I observed the discharge from CP5. The pivot appeared to be acheiving a good application and there was no ponding evident.

---

11 The discharge shall be managed to ensure that there shall be no discharge within 20 metres of any surface water body and the run-off of wastewater into any surface waterbody is prevented.

Compliance Report:
Complies

There are no waterways located within 20m of the discharge areas.

---

12 All stockwater races within the wastewater irrigation areas shown on Plan CRC153952D shall be piped or otherwise closed by 28 February 2017.

Compliance Report:
Complies

The stockwater race previously running through the center of the discharge field has been closed. A stockwater race remains next to the CP5 pivot, however a large buffer is currently in place as is a boundary hedge seperating the discharge area from the stockwater race. This has been discussed with senior officers and the decision made this stockwater race may remain, providing there continues to be a buffer of at least 20m and the buffer shelterbelt remains and is well maintained to ensure there is no risk of spray drift entering the race.

---

13 The discharge of treated wastewater shall only occur within the area labelled "Discharge Area A, B and C" on Plan CRC153952B according to the following setback distances:

a. Discharge Area A" no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *"Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land" or its successor, with wastewater spray irrigation set back by:*

    i. *No less than 40 metres from any site boundary where complying shelter is established*; or*

ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.*

b. Within “Discharge Area B” no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *“Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land” or its successor, with wastewater spray irrigation set back by:*

   i. *No less than 15 metres from any site boundary where complying shelter is established*; or*

   ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.*

c. Within “Discharge Area C” no wastewater spray irrigation shall commence within 10 metres of any site boundaries.

Compliance Report:

Complies

The majority of shelterbelts are now over 3m in height and generally well established. Ongoing replanting and maintenance of any 'gaps' in the shelterbelts should be carried out in the near future. The required setback distances are being complied with.

---

14 a. The consent holder shall undertake shelter planting as necessary to ensure that the effects of spray and aerosols from wastewater irrigation are not offensive or objectionable beyond the site boundary.* Note Wastewater spray irrigation is also precluded from occurring on Pt Lot 2 DP 82068 (as per the conditions of the designation)

b. Effluent shall not be applied:

   i. Onto land within 50 metres of any active community used for water extraction not owned by the holder of this consent and any community supply protection zones;

   ii. Onto land within 20 metres of any surface waterway;

   iii. Onto ground with no vegetative cover;

iv. Onto ground where surface ponding is occurring; and

v. There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours.

c. The consent holder shall prepare a Landscape Plan and shall provide it to the Canterbury Regional Council, Attn: RMA Compliance and Enforcement Manager prior to the commencement of planting confirming that the planting is consistent with the requirements of the Department of Public Health Public Health Services 1992 Guideline or its successor. The Landscape Plan shall include, but not be limited to, the following information:

i. The location and extent of each area of shelter planting.

ii. The species to be planted and the anticipated height of each plant following establishment.

iii. The minimum plant size and spacing required at planting to achieve the minimum plant height defined in clause (b) of this condition prior to the commencement of wastewater spray irrigation.

d. Once established the landscaping shall be maintained for the duration of the exercise of the consent, with any dead, dying or diseased plants being replaced within one growing season within plants of a similar species and in accordance with the planting specified in the Landscape Plan required under clause (c).

Compliance Report:

Complies

The majority of the shelterbelts on this property are well established and provide an adequate buffer to help ensure odour and aerosols associated with the discharge are mitigated against.

*Please see notes under previous condition re maintenance and replanting. There are no drinking water protection zones within 50m of the discharge area. The center pivots are set up to ensure no discharge occurs within 20m of any surface waterway.

Whilst on site I observed the discharge from CP5. On site we discussed the importance of ensuring sufficient vegetative cover is in place prior to using these areas to discharge effluent. Condition 14(b)(iii) specifically states effluent cannot be discharged onto ground with NO vegetative cover. There was some vegetative cover in place in this area, and therefore the discharge is considered 'compliant' with this condition. However, in future I recommend awaiting a greater density of vegetation cover prior to discharge in order to achieve the best possible treatment.

---

15 a. The discharge area shall be fenced to prevent stock, vehicle and public access.

b. At either end of the discharge area along Burnham School Road an easy visible sign should state " Potential Health Risks from Aerosolised treated sewage in this area".

Compliance Report:
Complies

The discharge area is well fenced. The require signage is in place at either end of the discharge area.

---

16 A notice shall be erected and maintained at all entrances to the site. This notice shall be legible at a distance of five (5) metres and shall inform the public of the nature of the activities occurring at the site, and that the disposal or waste by any other person is prohibited.

Compliance Report:
Complies

---

17 The discharge shall be managed to ensure that:

a. Aerosols and spray-drift arising from the discharge do not cause offensive or objectionable effects beyond the boundary of the discharge area.

b. Any odour resulting from spray irrigation of wastewater shall not result in offensive or objectionable effects on the environment beyond the boundary of the irrigated area.

Compliance Report:
Complies

At the time of my visit there was no odour or aerosols noted beyond the property boundary. I note there had been odour complaints in received in the past. Due to the location of these complaints it is possible these were due to the Robson's Environmental discharge occurring on the adjacent farm land. Environment Canterbury have not received any further complaints since this activity ceased.

---

18 a. All parts of the discharge area receiving wastewater shall be operated as a cut and carry operation.

b. There shall be no harvesting of crops within 48 hours of any wastewater irrigation.

c. All pasture harvested from the irrigation areas shall be removed for off-site disposal.

Compliance Report:
Complies

A cut and carry pasture management system is operated at this site. Irrigation of blocks to be cut ceases at least 48 hours prior to harvesting. Samples are taken after the rest period.

---

19 A Management Plan shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, at least two (2) months prior to the exercise of this consent. The Management Plan shall:

a. Set out how the activity authorised by this consent shall be operated to enable compliance with the consent conditions.

b. Be maintained at all times and any changes to the Management Plan shall be submitted to the Canterbury Regional Council prior to those changes taking effect.

Compliance Report:
Unable to determine compliance

This condition has been monitored n previous inspections. I understand there has been no change to the formal management plan, but that Stantec have provided further information following the completion of Stage 3. I recommend incorporating the Stantec information with the Management Plan and producing an updated management plan to include the recent upgrades.

---

20 The Management Plan referred to in Condition 19 shall include, but not be limited to, the following:

a. The method of sampling chemicals, quantities of wastewater and frequency of sampling throughout the operation.

b. The testing and calibration of all systems including backup generator, telemetry, and flow meters.

c. Sub-condition cancelled.

d. The monthly monitoring programme of the onsite bores identified on Plan CRC153952C.

21 The discharge shall be sampled from the irrigation pump chamber once per month and analysed for the following:

a. Biochemical Oxygen Demand.

b. Total Suspended Solids.

c. Total Kjeldahl Nitrogen.

d. Ammoniacal Nitrogen.

e. Faecal coliforms.

Compliance Report:
Not monitored

Chis confirmed the required samples are taken monthly and analysed for the above contaminants. This will be formally assessed upon receipt of the annual report in June 2019.

---

22 Daily records shall be kept of the following:

a. The volume of wastewater applied to land.

b. The irrigation zone over which the discharge is applied.

c. The depth of the application of wastewater.

Compliance Report:
Not monitored

These records are provided as part of the annual report due in June 2019. Compliance with this condition will be monitored at this time.

---

23 Monthly records shall be kept of the following:

a. The total volume of wastewater applied.

b. The total depth of wastewater applied.

c. The average effluent hydraulic loading rate.

d. The nitrogen loading rate (expressed as kilograms of nitrogen per hectare).

e. The mean dry weight of pasture removed from the site.

Compliance Report:
Not monitored

These records are provided as part of the annual report due in June 2019. Compliance with this condition will be monitored at this time.

---

24 Prior to the exercise of the consent, the consent holder shall review and update as necessary the 'Excursion Response Plans' (ERP) included in the application to be consistent with the conditions of consent, and submit a copy of the revised ERP to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager. Thereafter the ERP shall be maintained at all times and any changes to the ERP shall be submitted to the Canterbury Regional Council prior to those changes taking effect.

Compliance Report:
Complies

An Excursion Response Plan was provided in 2016 (int ref #C16C/15733)

---

25 For the purposes of monitoring the effects of the discharge on groundwater quality, in reference to the bores identified in condition (20):

a. The consent holder shall establish and maintain a minimum of three (3) on-site monitoring bores located down-gradient of the irrigation area and two (2) on-site monitoring bores located up-gradient of the irrigation area for the duration of this consent.

b. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall have screened sections extending from two (2) metres below the lowest water level to one (1) metre above the highest water level.

c. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall be sampled and analysed at least monthly for nitrate nitrogen and Faecal coliform:

d. In the event that the:

   i. concentration of nitrate nitrogen in any of the groundwater samples collected from the down-gradient monitoring bores referred to in clause (a) of this condition exceeds eight (8) milligrams per litre and is at least 30 per cent greater than the nitrate nitrogen concentration in the up-gradient bores also referred to in clause (a) of this condition; or

   ii. Faecal coliforms exceeds 50 coliform forming units (cfu)/ per 100 millilitres in any of the monitoring bores established in accordance with clause (a) of this condition;

Then the consent holder shall follow the response procedure outlined in the Excursion Response Plan.

Compliance Report:

Unable to determine compliance

A minimum of 2 upstream sampling bores and 3 down-stream sampling bores are established and maintained as per condition 25a. Based on the records provided, the ERP has been initiated as required.

Monthly sampling to determine the concentration of nitrate nitrogen and Faecal Coliforms has been conducted. The nitrate levels in down gradient bores exceeded 8 mg/L on a number of occasions between June 2017 to October 18. Previously, Amit explained there is concern other activities up gradient of The Pines may be impacting on these results, due to poor coverage of upgradient sampling bores. Amit informed me a bore has been drilled on the north-west corner of the property in an attempt to discount other potential influencers. No sampling has taken place as of yet.

ECan was noted of the ERP initiation on several occasions late 2018.

There is potential the unauthorised discharges by Robson's Environmental on SDC land adjacent to several of these monitoring bores may have elevated the down gradient contaminant levels. Amit informed me there have still been some high nitrate readings from time to time, but none that would trigger the ERP requirements. Monitoring records for Dec 18 to present have been requested.

---

26 For the purposes of monitoring the effects of the discharge on soils:

a. Samples of soil shall be collected twice annually from the land beneath each centre pivot irrigator or k-line irrigation area that has received treated wastewater irrigation in the previous six (6) months.

b. Sampling shall occur between a depth of zero (0) and 50 millimetres.

c. A minimum of four (4) samples shall be taken from each area sampled and all samples from the wastewater irrigation site shall be combined into a single composite sample and be analysed for the following:

   i. Total cadmium

   ii. Total chromium

   iii. Total copper

   iv. Total lead

v. Total nickel

vi. Total zinc

vii. Total nitrogen

viii. Total mercury

ix. Total arsenic

Compliance Report:
Not monitored

This condition will be monitored upon receipt of the annual report in June 2019.

---

27 a. If any of the results of any of the analysed samples in accordance with condition 26 exceed the thresholds specified in clause (b) of this condition the consent holder shall:

i. Cease wastewater irrigation over that irrigation area.

ii. Advise the Canterbury Regional Council within ten (10) days of the receipt of the results, and outline the steps taken to address elevated soil concentrations, including any remediation or mitigation measures.

iii. Not recommence wastewater irrigation over that irrigation area until further sampling demonstrates to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, compliance with the thresholds specified in clause (b) of this condition.

b.

c.

Trace Element	Limit (milligrams per kilogram) dry weight
Total Cadmium	1
Total Chromium	600
Total Copper	100
Total Lead	300
Total Nickel	60
Total Zinc Total Mercury	300 1
Total Arsenic	20

Compliance Report:
Not monitored

28 All samples required under this consent shall be taken by a suitably qualified and experienced person, and shall be analysed using methods approved by the American Public Health Association or the American Society for the Testing of Materials by a laboratory that is accredited for that method of analysis by International Accreditation New Zealand (IANZ) or by an organisation with a mutual agreement with IANZ.

29 The results of all samples taken under this consent shall be provided to the Canterbury Regional Council within ten (10) working days of receipt of the samples.

30 The consent holder shall provide the Canterbury Regional Council with an Annual Monitoring Report each year commencing 12 months from the date of the exercise of this consent. The Annual Monitoring Report shall include, but not be limited to:

a. Monthly monitoring records.

b. All sampling results required under the conditions of consent.

c. Annual average nitrogen loading rate.

d. A record of any complaints from members of the public and actions taken.

e. Status of compliance with consent conditions.

f. Reasons for any non-compliances and actions taken or planned to prevent re-occurrences.

This report shall then become the formal record of results for that year.

Compliance Report:

Complies

The 2017-18 Annual Report was provided on the 6th August 2018. The next annual report is due end of July 2019.

31 a. Prior to the construction of the Pines Wastewater Treatment Facility, design plans shall be certified by a Chartered Professional Engineer (CPEng) with at least five (5) years experience in the design and construction of wastewater treatment systems to confirm that the system has been suitably designed to achieve or better the values set out in Condition 10(a).

b. A copy of the certified design plans shall be submitted to the Canterbury Regional Council, Attention: Environmental Compliance Manager, at least one month prior to construction.

Compliance Report:
Not monitored

---

32 a. Prior to the exercise of this consent, the consent holder shall establish a reticulated water supply which provides sufficient water to cover the property holders domestic needs to the properties located within the area bound by Brookside Road, Ellesmere Junction Road and Edwards Road.

b. The consent holder shall maintain the reticulated supply for the duration of this consent and ensure the quality of water supplied complies with New Zealand Drinking Water Standards 2008 criteria.

Compliance Report:
Complies

Based on the maps provided, the reticulated supply runs north to south down Burnham Road up to and including property 99. The full extent of Ellesmere Junction Road, Brookside Road and Edwards Road as required have a reticulated supply available to them. The maps are available at (C19C/21968).

---

33 a. In the event of any disturbance of Koiwi Tangata (human bones) or taonga (treasured artefacts), during the construction or installation of the treatment and disposal facilities, the consent holder shall immediately:

i. Cease earthmoving operations in the affected area

ii. Mark off the affected area until earthmoving operations recommence

iii. Advise the Canterbury Regional Council of the disturbance

iv. Advise the Upoko Runanga of Te Taumutu Runanga, or their representative (contact information can be obtained from the Canterbury Regional Council), and the New Zealand Historic Places Trust, of the disturbance.

b. Earthmoving equipment operations shall not recommence until either;

i. the consent holder provides a certificate in writing to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, signed by Upoko Runanga of Taumutu, or their

representative(s), stating that appropriate action has been undertaken in relation to the discovered culturally sensitive material; or

ii. after five (5) working days after advising the Taumutu Runanga, a certificate signed by an archaeologist (i.e., a person with a post graduate degree in archaeology, and who is a member of the New Zealand Archaeological Association) is provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that states that in the archaeologist's opinion appropriate action has been undertaken in relation to the discovered culturally sensitive material. That certificate shall detail the action that has been undertaken by the consent holder. A copy of the archaeologist's qualifications shall also be provided with any such certificate.

---

34 The lapsing provisions of Section 125 of the Resource Management Act 1991 shall not apply to this consent until 31 March 2030.

---

35 The Canterbury Regional Council may, once per year, on any of the last five (5) working days of March or September serve notice of its intention to review the conditions of this consent for the purposes of either of the following:

a. Dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.

b. Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

---

36 When discharging wastewater to land adjacent to the Plan Change land, the consent holder shall ensure that:

a. The discharge shall be in an aerobic state.

b. The dissolved oxygen concentration shall not be less that a trigger level of 0.5 grams per cubic metre.

c. The dissolved oxygen concentration in the discharge shall be continuously monitored and an alarm fitted that activates in the event that the dissolved oxygen concentration is less than the trigger level in clause (b) of this condition.

d. The dissolved oxygen monitoring device shall be calibrated and serviced annually.

Compliance Report:
Complies

Based on the information provided in the annual report DO levels do not exceed the consented trigger limit of 0.5 grams per cubic meter. Do levels are continuously monitored at the site. According to Chris, the DO meter is calibrated and service annually.

---

37 The requirements of Conditions 36(c) and 36(d) shall be undertaken by the consent holder for a minimum of at least two (2) years from the date of commencement of spray irrigation of wastewater to land in accordance with this consent.

---

38 The requirements of Conditions 36(c) and 36(d) shall no longer apply upon provision of a certificate signed by the person responsible for designing the wastewater irrigation system, or by a chartered Professional Engineer (CPEng), to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, certifying that;

a. dissolved oxygen in the discharge has been continuously monitored for at least two (2) years; and

b. the minimum level of dissolved oxygen concentration specified in Condition 36(b) has been continuously met or exceeded during that two (2) year period.

---

39 If the minimum level of dissolved oxygen concentration specified in Condition 36(b) is breached, or the median concentration of faecal coliforms is greater than 500 colony forming units per 100 millilitre sample, then the following provisions shall apply:

a. Any discharge of treated wastewater to land adjacent to the Plan Change land shall be setback no less that 200 metres from the common boundary as shown on Plan CRC101109.1C when the winds of any strength are from 170°N to 310°N; provided that

b. When the winds are not from 170°N to 310°N any discharge of treated wastewater shall comply with the setback distances prescribed by Condition 40.

Compliance Report:
Complies

CP5 is fitted with an alarm in the even of low DO within the CP5 prohibited zone. Further to this the pivot is programmed to cease the discharge while it moves outside of the specified zone. The required separation distance from the residential land boundary of >200 m is adhered to. E.Coli sampling results provided as part of the annual report show results of less than 500CFU/100ml sample. The pivots are fitted with valves and actuators to allow the outer sprinklers to be shut off as the pivot approaches the property boundary's associated with Plan Change 8. I am told wind direction is closely monitored to ensure compliance with Condition 39(b).

---

40 In respect of shelter belt planting:

a. The consent holder shall establish a shelter belt comprising three rows of closely planted evergreen trees along the common boundary defined under Condition 39(a).

b. No discharge of treated wastewater to land shall occur within 150 metres of that common boundary until;

   i. the trees referred to in Condition 40(a) have reached a consistent minimum height of three (3) metres and have developed into a dense continuous shelter belt without gaps; and

   ii. the consent holder has demonstrated to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that the boundary plantings comply with Condition 40(b)(i).

c. Following confirmation pursuant to condition 40(b)(ii), discharge of treated wastewater to land may occur up to 25 metres from the common boundary defined under Condition 39(a).

Compliance Report:

Complies

At present no discharge occurs within 150m of the common boundary. CP7 has been reprogrammed to ensure separation distances are maintained. The shelterbelts required by this condition have been planted along the internal boundary as required. Please ensure maintenance and replanting occurs as necessary to ensure a dense cover without gaps is maintained as per Condition 40(b)(i).

---

41 There shall be no end guns associated with the wastewater spray irrigation system located on Pt Lot 1 DP 65117 or Pt RS 33357, being that part of the land subject to this consent located north or Burnham School Road.

Compliance Report:

Complies

There are no end guns on pivots within these areas.

---

42 In the event of cessation of irrigation from the wastewater spray irrigation system for more than 24 hours on land adjacent to the Plan Change land, the consent holder shall not start up irrigation from the spray irrigation system within 200 metres of the common boundary defined under Condition 39(a).

---

43 No discharge of treated wastewater to land from a spray irrigation system shall occur within 150 metres of the common boundary defined under Condition 38(i) unless:

a. The spray nozzles are no more than two (2) metres above ground level.

b. The spray nozzles produce large consistent droplets such as produced by the Nelson R3000 brand or similar product.

c. The operating pressure at the spray irrigation nozzle does not exceed 103 kilopascals (kPA).

Compliance Report:

Complies

The centre pivot in this area is fitted with R3000 nozzles. Amit informed me they are designed to achieve a maximum pressure of 100kPa. The nozzles are within 2m of the ground level.

General comments

Date Inspected: 11 Dec 2018

Monitored By: Trinity White

Signature:

RMO II Monitoring & Compliance

General information

Canterbury Regional Council Obligations

Under Section 35 of the Resource Management Act 1991, the Canterbury Regional Council has a duty to monitor all resource consent exercised within its region, to make sure all the conditions are being complied with.

Monitoring Frequency

The frequency with which your consent is monitored will vary according to the type of activity your consent authorises, the conditions imposed and the extent to which you have complied with these conditions on previous visits. **If you fully comply with all conditions then frequency will reduce to the minimum set for the activity.**

Costs

It is the Council's policy to recover all actual and reasonable costs of compliance monitoring of resource consents.

From:	Cinnil Thomas
To:	Trinity White
Cc:	"Ian Shaw"; "Lisa Shaw"; Chris Salkeld; Rachel Tompkins; Leila Dadian
Subject:	Re: Pines WWTP Groundwater Bores - ERP Response
Date:	Friday, 2 November 2018 9:07:41 AM

Dear Trinity,

We have received Test Results for the monitoring bores at Pines WWTP.

- **Nitrate level:** BX23/0206 results are at 9.2mg/L for nitrate which is > 8mg/L

Our intention is to monitor Pines bores very closely and activate the ERP

I have Ccéd our EHO, Contract engineer, OMC and WQO in this correspondence.

Regs

Cinnil Thomas

WATER SERVICES –TEAM LEADER | SERVICE DELIVERY - ASSETS

DDI: (03) 347 2728
Mobile: + 64 27 539 8316
Email: xxxxxx.xxxxxx@xxxxxx.xxxx.xx

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www.selwyn.getsready.net | m.selwyn.govt.nz

From: Trinity White
To: Amit Chauhan
Subject: Re: Pines WWTP Effluent Sampling
Date: Thursday, 28 March 2019 7:40:31 AM

Good morning Amit,

As long as the sample point is from the pump chamber in accordance with CRC153952 I don't see an issue. Are you having trouble with contamination from the irrigation line?

Regards

Trinity

Sent from my Samsung Galaxy smartphone.
-------- Original message --------
From: Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx>
Date: 27/03/19 13:45 (GMT+12:00)
To: Trinity White <xxxxxxx.xxxxx@xxxx.xxxx.xx>
Cc: Chris Salkeld <xxxxxx@xxxxx.xx.xx>
Subject: FW: Pines WWTP Effluent Sampling

Hi Trinity,

Our Pines treatment plant operators have proposed to shift the final effluent testing sample tap within the plant (as marked in the pic attached) to remove any concerns with contamination of the feed lines from the irrigation main to the sample taps. This tap is currently located outside the plant on irrigation line.
As per Condition 21 of CRC 153952 , sampling is required from irrigation pump chamber once in a month. Not sure why this was hooked on to irrigation line, probably for ease of sampling. I do not see this as an issue. Can you please have a look and let us know if you have any concerns.

Regards

Amit

2 Norman Kirk Drive, Rolleston 7614
PO Box 90, Rolleston 7643
Phone: (03) 347-2800 or (03) 318-8338
Fax: (03) 347-2799
www.selwyn.govt.nz | www.selwynlibraries.co.nz
www.selwyn.getsready.net | m.selwyn.govt.nz

From: Bridgette Johnston
To: Trinity White
Cc: Amit Chauhan
Subject: RE: Burnham Rd. Water connections
Date: Thursday, 23 August 2018 11:13:21 AM
Attachments: Water connections.xlsx

Hi Trinity,
121, 119 and 89 are connected from Burnham Road.
473 and 471 are not connected.
Regards,

Bridgette Johnston
Water Services - Business Support Officer
SELWYN DISTRICT COUNCIL | DDI: 03 347 2795

From: Amit Chauhan
Sent: Thursday, 23 August 2018 9:43 a.m.
To: Bridgette Johnston <x@xxx
Subject: FW: Burnham Rd. Water connections
Can you please check and confirm if these properties are connected to our supply.
Regards
Amit

From: Trinity White [mailto:x@xxx]
Sent: Thursday, 23 August 2018 9:33 AM
To: Amit Chauhan <x@xxx>
Subject: RE: Burnham Rd. Water connections
Thank you Amit,
I just want to check I am reading the map correctly. On the coloured map, would 473, 471, 121, 119 and 89 also be connected?
Regards,

Trinity

From: Amit Chauhan <x@xxx>
Sent: Thursday, 23 August 2018 9:28 AM
To: Trinity White <x@xxx>
Subject: Burnham Rd. Water connections
Hi Trinity,
As discussed,
Please find attached the map of council water network near Burnham rd area.
Please let me know if you need any more information.
regards

Amit Chauhan l Water & Waste Water Engineer l Selwyn District Council
DDI: 03 347 2848

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AssetID	classcombo	ServiceStatus	Ownership	Scheme	InstallDate
520010	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	1/07/2008
520011	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	1/07/2008
520012	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	1/07/2008
521018	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	15/07/2009
521081	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
521082	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
662843	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	1/01/2018
608059	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	13/12/2012
626687	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	13/11/2015
634917	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	1/10/2015
639500	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	17/03/2016
648351	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	24/03/2017
651152	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	1/01/2009
608053	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	1/01/2012
608054	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	13/12/2012
608055	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	13/12/2012
608056	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	1/01/2012
608057	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	13/12/2012
608058	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	13/12/2012
600500	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	17/02/2011
601784	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	7/12/2011
603474	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	16/09/2011
608050	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	13/12/2012
608051	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	1/01/2012
608052	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	13/12/2012
594702	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594703	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594704	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594705	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594706	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594715	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594696	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594697	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594698	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594699	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594700	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594701	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594690	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594691	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594692	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594693	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594694	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594695	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
563485	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	4/11/2011
585767	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	26/02/2014

591027	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	31/12/1993
594687	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594688	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
594689	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
521083	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
521084	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
521085	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
521086	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
521087	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009
521088	Water-Supply Point-Manifold/ Meter	In Service	SDC 5Waters	Rolleston	11/12/2009

Position
511 Mtrs West from Dunns Crossing Road, Burnham School Road, Rolleston
16.8M R/H side of D/W
Between D/W, 119 Burnham Road
Resource Recovery Park, 210m from LH boundary.
Dog Pound
RHS of 2
This is the LHS meter of two
Inside wooden box outside sewerage plant
R/H side of driveway. Approx 5.8M from roadside, 152 Edwards Road
Opposite 271 Burnham School Road, opposite Pines WWTP. Irrigation connection for she
Opposite 152 Edwards Road, Rolleston
meter on edwards road
R/H Side, 271 Burnham Road
Along back fence, off Burnham Road, 2315 Main South Road
Along back fence, off Burnham Road, 2311 Main South Road
Along back fence, off Burnham Road, 2309 Main South Road
Behind rock wall, 288 Burnham Road
49M from RHB, 481 Burnham School Road, Rolleston
R/H side, 239 Burnham Road
L/H side, 243 Burnham Road
R/H side, 245 Burnham Road
L/H side, 247 Burnham Road
R/H side, 67 Burnham Road
R/H side near stop sign, 265 Burnham Road
R/H Side, 225 Burnham Road
L/H side, 227 Burnham Road
L/H Side, 229 Burnham Road
L/H side, 231 Burnham Road
L/H side, 233 Burnham Road
22.8M R/H side of D/W

Behind Power Pole,
R/H side D/W, 465 Burnham School Road, Rolleston
Mtr on boundary under hedge. 60M RHS, 499 Burnham School Road, Rolleston
R/H side, 219 Burnham Road
R/H,
R/H of D/W, 89 Burnham Road
139m from RHB, 155 Burnham Road
R/H side, 203 Burnham Road
WINDERBURN RHS DWAY, 423 Burnham School Road, Rolleston
R/H, 453 Burnham School Road, Rolleston

LinzAddress
286 Brookside Road, Rolleston ROLLESTON
304 Brookside Road, Burnham BURNHAM
348 Brookside Road, Burnham BURNHAM

127 Burnham Road, Burnham BURNHAM
119 Burnham Road, Burnham BURNHAM
481 Burnham School Road, Burnham BURNHAM
1076 Ellesmere Junction Road, Burnham BURNHAM
183 Burnham School Road, Burnham BURNHAM
284 Brookside Road, Rolleston ROLLESTON
271 Burnham School Road, Burnham BURNHAM
2313 Main South Road, Burnham BURNHAM
285 Burnham Road, Burnham BURNHAM
910 Ellesmere Junction Road, Burnham BURNHAM
942 Ellesmere Junction Road, Burnham BURNHAM
964 Ellesmere Junction Road, Burnham BURNHAM
974 Ellesmere Junction Road, Burnham BURNHAM
1106 Ellesmere Junction Road, Burnham BURNHAM
1106 Ellesmere Junction Road, Burnham BURNHAM
271 Burnham School Road, Burnham BURNHAM
152 Edwards Road, Burnham BURNHAM

lter belt.

113 Edwards Road, Burnham BURNHAM
862 Ellesmere Junction Road, Burnham BURNHAM
271 Burnham Road, Burnham BURNHAM
2315 Main South Road, Burnham BURNHAM
2311 Main South Road, Burnham BURNHAM
2309 Main South Road, Burnham BURNHAM
288 Burnham Road, Burnham BURNHAM
481 Burnham School Road, Burnham BURNHAM
239 Burnham Road, Burnham BURNHAM
243 Burnham Road, Burnham BURNHAM
245 Burnham Road, Burnham BURNHAM
247 Burnham Road, Burnham BURNHAM
249 Burnham Road, Burnham BURNHAM
265 Burnham Road, Burnham BURNHAM
225 Burnham Road, Burnham BURNHAM
227 Burnham Road, Burnham BURNHAM
229 BURNHAM ROAD BURNHAM
231 Burnham Road, Burnham BURNHAM
233 Burnham Road, Burnham BURNHAM
235 Burnham Road, Burnham BURNHAM
133 Burnham Road, Burnham BURNHAM
121 Burnham Road, Burnham BURNHAM

286 Brookside Road, Rolleston ROLLESTON
465 Burnham School Road, Burnham BURNHAM
499 Burnham School Road, Burnham BURNHAM
219 Burnham Road, Burnham BURNHAM
99 Burnham Road, Burnham BURNHAM
89 Burnham Road, Burnham BURNHAM
155 Burnham Road, Burnham BURNHAM
203 Burnham Road, Burnham BURNHAM
423 Burnham School Road, Burnham BURNHAM
453 Burnham School Road, Burnham BURNHAM

From: Amit Chauhan
To: Trinity White
Subject: RE: CRC153952 The Pines - proposed upgrades, stockwater race closure & nitrate monitoring
Date: Friday, 17 August 2018 5:53:55 PM
Attachments: image001.png
image003.jpg
2018081717424113 4.pdf

Hi Trinity ,

Thanks for your visit today.

Please refer to the following mail extract on Nitrate in Pines monitoring bores.

Since the elevated nitrate level has been a recurring event, there is a watch out notice in place to the downstream bore owners (attached for your reference).
We have the council water supply extended to cove the downstream residences.

We will revert with a response on stock water race.

Regards

Amit

From: Trinity White [mailto:xxxxxxx.xxxxx@xxxx.xxxx.xx]
Sent: Friday, 17 August 2018 4:35 PM
To: Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx>
Subject: CRC153952 The Pines - proposed upgrades, stockwater race closure & nitrate monitoring

Hello Amit,

Thank you for meeting with me today, I appreciate you involving ECan with your future plans for The Pines.

As promised, I will seek further guidance on today's proposals and get back to you.

I wanted to follow up on a couple of the items we discussed today.

As discussed on site, there are a number of occurrences where the nitrate results have been in breach of condition 25 of CRC153952. During our discussion you stated a previous monitoring officer had allowed for exceedances to not be determined as non-compliant based on a suspected unrepresentative upstream sample bore. Could you please provide supporting documentation. Importantly, I note some of these results are above the Ministry of Health Drinking Water (2008) MAV of 11.3 mg/L of nitrate. Can you please confirm if the ERP was initiated when these results were noted? In particular have downstream users been notified of any of these exceedances?

During our drive to inspect the shelterbelts near CP5 I note there is a stockwater race that has not been piped or closed in accordance with Condition 12 of CRC153952. The area of race in question can be seen marked in red on the map below.

Kind regards,

Trinity

Trinity White
Resource Management Officer II Monitoring and Compliance
Environment Canterbury

xxxxxxx.xxxxx@xxxx.xxxx.xx

PO Box 345, Christchurch 8140
Customer Services: 0800 324 636
24 Hours: 0800 76 55 88

2 Norman Kirk Drive, Rolleston 7614
PO Box 90, Rolleston 7643
Phone: (03) 347-2800 or (03) 318-8338
Fax: (03) 347-2799
www.selwyn.govt.nz | www.selwynlibraries.co.nz
www.selwyn.getsready.net | m.selwyn.govt.nz

Selwyn
DISTRICT COUNCIL

12 July 2017

To,

Rolleston private bore owners

Burnham School Road and Selwyn Road

Rolleston

Dear Resident,

This is a further update to previous notification of increased nitrate level in the bore water in areas of Burnham School Road and Selwyn Road in Rolleston we issued earlier. **This is not applicable to residents who are connected to Council water supply.**

Council has ground water quality monitoring bores around Pines WW treatment plant, Rolleston. The sample monitoring bores are at a shallow depth of 14 – 24m and so may not be indicative of the nitrate levels at deeper bores which usually tend to have lower nitrate levels than the shallow bores.

Out of the 11 bores that Council monitor near this area, few bores show higher nitrate values. Below is the reference from Drinking Water Standard.

"Drinking Water Standards for New Zealand set a Maximum Acceptable Level of 50mg/L for nitrate, which is equivalent to 11.3mg/l nitrate-nitrogen. Some laboratories report nitrate levels whereas other report nitrate-nitrogen, ensure that you are aware which they are reporting if you are getting your water tested."

We recommend you test your private bore water at an approved laboratory for confirmation of your water quality. Advice on the issues associated with nitrates in drinking water is available online at www.cph.co.nz/your-health/drinking-water

Yours faithfully,

Water Services Team

www.selwyn.govt.nz
Selwyn District Council, 2 Norman Kirk Drive Rolleston /PO Box 90, Rolleston 7643
Tel: 03 347 2800 Fax: 03 347 2799 Email: admin@selwyn.govt.nz

file copy

Environment Canterbury
Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636
200 Tuam Street
PO Box 345
Christchurch 8140
E. ecinfo@ecan.govt.nz
www.ecan.govt.nz

7 February 2020

Selwyn District Council
PO Box 90
Rolleston 7643

Dear Sir/Madam

Compliance Monitoring Report
Selwyn - Waihora Water Management Zone

Please find enclosed your compliance monitoring report for the following activity. It is important that you read this report carefully.

Consent number:	CRC153952
Location:	Burnham School Road, Main South Road & Brookside Road, ROLLESTON
Description:	To discharge contaminants to land and to air.

Overall consent compliance: **Non-compliance Action required**

This matter needs your immediate attention.

Reason(s) for non-compliance:

- Condition 7 – The maximum application depth of 20mm was exceeded.
- Condition 9 – The 95th percentile for FC at the pump chamber was exceeded.
- Condition 25 – The groundwater monitoring bores do not comply. Nb. This issue is in the process of being resolved.

Please contact me on (03) 365-3828 to discuss the actions needed to achieve compliance.

Yours sincerely

Trinity White
Senior RMO Compliance Monitoring & Incident Response - Christchurch West
Melton

Doc No: *C20C/19037*
Your Customer No: *EC118692*
File No(s): *CRC153952*

Consent No: ***CRC153952***

Description of consent	**Commencement Date**
To discharge contaminants to land and to air.	06 Mar 2015
Location	**Expiry Date**
Burnham School Road, Main South Road & Brookside Road, ROLLESTON	17 Dec 2045

Conditions & compliance

1 The discharge shall be only:

a. Treated wastewater originating from the Pines Wastewater Treatment Facility located at Lot 1 DP 309881, Burnham School Road, Burnham as shown on Plan CRC153952A; and

b. Odour and aerosols associated with the spray irrigation of treated wastewater.

Compliance Report:

Complies

The discharge is only wastewater originating from the treatment facility and associated odour and aerosols.

---

2 The discharge shall only occur within Wastewater Discharge Area A, B and C shown on Plan CRC153952B, and bound by Topo50 map references:

a. Topo50 BX23 459 672, BX23 472 699, BX23 467 708 and BX23 451 699; and

b. Topo50 BX23 453 700, BX23 472 710, BX23 468 717, BX23 454 710, BX23 455 709, BX23 449 716, BX23 450 705 and BX23 451 705.

c. The total combined volume of treated wastewater discharged under this consent and CRC131423 shall not exceed 25,614 cubic metres per day over the wastewater irrigation areas shown on Plan CRC153952B.

d. For the purposes of compliance with this condition the consent holder shall operate a flow meter which continuously monitors the volume of wastewater discharged to the irrigation area.

Compliance Report:

Complies

---

3 The consent holder shall ensure that influent volumes of wastewater do not exceed the operating capacity of the treatment and irrigation systems.

Compliance Report:
Complies

The maximum influent volume for the reporting period was 9868m^3 on the 1st of August 2019.Capacity is reported in Population Equivalent (PE) and is based on 220L/person/day. Therefore, the current max PPE volume entering the plant is 44.85 PPE.

Stantec have reported the following operating capacities for Pines III. As seen in the commentary provided by Stantec below, the design capacity of Pines III is 45,000 PPE therefore the maximum influent volume does not exceed the operating capacity. However, I do note in Table 3.3 Stantec has reported the Solar Drying Hall capacity as 40,000 PPE which is below the maximum influent volume entering the plant.

Having said that, I understand a second solar drying room has been commissioned and is due for construction later this year. This will increase the Solar Drying Hall capacity to 58,000 PPE. Please continue to keep Environment Canterbury informed of progress in the construction of the new drying room, particularly considering the odour observed from the drying room on the day of my site inspection.

The design capacity for the Pines III WWTP is 45,000PE. However, some civil works, such as the inlet works channels, are designed for the future site layout for 60,000 PE. The table below summarises the design capacity to be provided for Pines III WWTP.

Table 3-3: Process Unit Design Capacity

Component	Civil Works	Mechanical Supply	Comments
Inlet Screens	60,000 PE	45,000PE	
Grit Removal	60,000 PE	60,000PE	
Bioreactors	60,000 PE	45,000 PE	15,000 PE each
Clarifiers	60,000 PE	60,000 PE	Construction of the third bioreactor increased the capacity of the existing clarifiers
UV Disinfection Channels	60,000 PE	60,000 PE	

Component	Civil Works	Mechanical Supply	Comments
Irrigation Pump Station wet well	60,000 PE	45,000 PE	
Centre Pivot Irrigators	84,000 PE	61,600 PE	Staged development
Dewatering Centrifuges	60,000 PE	60,000 PE	
Solar Drying Halls	40,000 PE	40,000 PE	July 2019: under procurement to increase capacity to 58,000 PE

Further to this, with plant expansion underway it will be important to ensure that any expansion is within the scope of your current resource consents (CRC101111 (storage), CRC040100.1 (air discharge) and CRC153952 (discharge to land)) and that a variation is not required.

---

4 The consent holder shall ensure that:

a. The discharge receives ultra-violet disinfection prior to irrigation.

b. The median concentration of faecal coliforms in the discharge shall not exceed 500 faecal colony forming units per 100 millilitre sample.

c. An alarm is fitted to the ultra-violet disinfection system which activates in the event that an inadequate dose is applied.

The ultra-violet disinfection system is calibrated and serviced annually.

Compliance Report:
Complies

a. The discharge receives UV disinfection prior to discharge.
b. The median concentration of faecal coliforms in the discharge was 42 cfu/100ml sample.
c. An alarm is fitted.

Please provide certification demonstrating the UV system has been serviced and calibrated within the past 12 months.

---

5 Alarm systems shall be installed at the treatment plant to warn of a power failure or a failure of any critical treatment system components. Standby power generation shall be available at all times the plant is operational.

Compliance Report:
Complies

During my visit I was informed by the plant manager Chris that a number of alarms are installed to warn of power failure. These alarms are linked to various employees who are alerted in the event of power and/or equipment failure. A standby generator is available.

---

6 The discharge shall occur only via a spray irrigation system.

Compliance Report:
Complies

The discharge occurs via center pivots.

---

7 The application depth of the discharge shall not exceed 64 millimetres over any consecutive five (5) day period, and no single application shall exceed a depth of 20 millimetres.

Compliance Report:
Non-compliance Action required

24 July 2019 - CP3

The reported application depth for CP3 on the 24th of July 2019 was 7.4mm. Based on the information provided and as detailed below I have calculated the maximum application depth to be 22.5mm for 20% of the area (i.e. that area where 3 revolutions took place).

Daily Runtime = 1208 minutes
Time Taken to Complete Revolution = 546 minutes
1208 / 546 = 2.2 revolutions completed on this day

Total Volume Discharged = 2060.7m^3
2060.7m3 / 2.2 revolutions = 936.7m3 discharged per revolution

Total Discharge Area = 125,664m
2060.7m3 / 125,664m2 = 0.0075m x 1000 = 7.5mm

Therefore, the application depth is as follows:
1 Revolution = 7.5 mm
2 Revolutions = 15 mm
3 Revolutions = 22.5 mm

In order to achieve compliance, please ensure that no application results in an application depth (including for a portion of the discharge area) of greater than 20 mm.

---

8 The discharge shall not exceed a monthly average hydraulic loading rate of eight (8) millimetres per day.

Compliance Report:
Complies

The maximum monthly hydraulic loading was 7.97mm in November 2019 under CP4.

---

9 a. Prior to irrigation, the discharge shall be treated to ensure the following standards are met:

Parameter	Median*	95th Percentile*
Biochemical Oxygen Demand (BOD)	15	60
Suspended Solids	20	90
Total Nitrogen	7	35
Faecal Coliforms (cfu/100ml)	500	1,000

*All values are expressed in grams per cubic metre except faecal coliforms which are expressed colony-forming units per 100 millilitre sample.

b. In order to demonstrate compliance with Condition 9(a), samples of wastewater shall be taken from the pump chamber and analysed at least monthly.

Compliance Report:

Non-compliance Action required

Biochemical Oxygen Demand (BOD)
median = 4
95th percentile = 8.4

Suspended Solids
median = 6
95th percentile = 12.8

Total Nitrogen
median = 5.9
95th percentile = 5.92

Faecal Coliforms (cfu/100ml)
median = 100
95th percentile = 1135 (non-compliant)

As seen below, the audit sample taken at the time of my visit also shows elevated FC results.

Sample Type: Aqueous		
	Sample Name:	SQ35926 - Pines 2 Rolleston at irrigation pump chamber 12-Dec-2019 2:40 pm
	Lab Number:	2292444.1
Total Suspended Solids	g/m^3	6
Total Nitrogen	g/m^3	6.6
Nitrate-N + Nitrite-N	g/m^3	3.5
Total Kjeldahl Nitrogen (TKN)	g/m^3	3.2
Total Phosphorus	g/m^3	4.7
Total Biochemical Oxygen Demand ($TBOD_5$)	$g\ O_2/m^3$	6
Faecal Coliforms	cfu / 100mL	1,500 #1

The following explanation was provided by Amit Chauhan of SDC:

" You will note that the results from lab during the month of November and December do not match. While all our internal lab samples have reported low FC count the external lab results have shown very high FC count. Please note, the internal samples are tested under a USEPA approved Tecta AMDS system that eliminates any human errors in detection of FC TC and EC and gives a lab grade result. As stated in my previous mail, We had asked the Food and health to do an enquiry on sampling procedures and lab results. They have confirmed that there were issues with the way samples were being taken. The samples were not allowed enough runoff time which potentially allowed stagnant water in the sample tap pipe being sent for sampling. This pipe being exposed to sun was proving to be a perfect breeding ground for the FC and hence resulting in elevated results. New procedure has been put in place to allow a minimum 2 minutes of runoff from sampling tap before collecting the samples. Also, taking note of the warm weather, instructions have been given to the samplers to maintain sufficient ice packs in the chilly bin and keep a tab of any hold up of sample in lab. The recent result from the lab sampled on 20th Jan with all the changed sampling procedure has returned with low FC consistent with our site lab results finding. "

Unfortunately all samples submitted under this resource consent must be analysed by an IANZ accredited laboratory as per Condition 28. On this basis, I have used the Hills Lab results to determine compliance not SDC's inhouse lab results.

---

10 There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours.

Compliance Report:
Complies

Whilst on site I observed the discharge from CP1, there was no ponding evident. As previously discussed, please continue to work through filling in the center pivot ruts with gravels to minimise the risk of ponding within these depressions.

---

11 The discharge shall be managed to ensure that there shall be no discharge within 20 metres of any surface water body and the run-off of wastewater into any surface waterbody is prevented.

Compliance Report:
Complies

---

12 All stockwater races within the wastewater irrigation areas shown on Plan CRC153952D shall be piped or otherwise closed by 28 February 2017.

Compliance Report:
Unable to determine compliance

Please refer to the comments below, taken from the June 2019 compliance report.

"The stock water race running through the centre of the discharge area has been closed. One stock water race remains adjacent to the discharge are covered by CP5. A buffer of greater than 20m is currently in place, furthermore there is a boundary hedge between the discharge area and the stock water race. The race is just within the area on Plan CRC153952D but outside of the 'wastewater irrigation area' as defined by Plan CRC153952B. After discussing this with a senior officer, I suggest that the race may remain, providing there continues to be a buffer of at least 20m and the boundary shelterbelt remains and is well maintained to ensure no spray drift enters the race."

---

13 The discharge of treated wastewater shall only occur within the area labelled “Discharge Area A, B and C” on Plan CRC153952B according to the following setback distances:

a. Discharge Area A" no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *"Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land" or its successor, with wastewater spray irrigation set back by:*

   i. *No less than 40 metres from any site boundary where complying shelter is established*; or*

   ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.*

b. Within "Discharge Area B" no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *"Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land" or its successor, with wastewater spray irrigation set back by:*

   i. *No less than 15 metres from any site boundary where complying shelter is established*; or*

   ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.*

c. Within "Discharge Area C" no wastewater spray irrigation shall commence within 10 metres of any site boundaries.

Compliance Report:
Not monitored

This was not monitored during this site visit due to time constraints, however as previously stated, areas where the boundary hedge was low or missing trees were noted during previous site visits. recommend Sicon conduct an audit into the height and density of planting for all of the shelter belts detailed under this condition to ensure compliance is achieved.

---

14 a. The consent holder shall undertake shelter planting as necessary to ensure that the effects of spray and aerosols from wastewater irrigation are not offensive or objectionable beyond the site boundary.* Note Wastewater spray irrigation is also precluded from occurring on Pt Lot 2 DP 82068 (as per the conditions of the designation)

b. Effluent shall not be applied:

   i. Onto land within 50 metres of any active community used for water extraction not owned by the holder of this consent and any community supply protection zones;

   ii. Onto land within 20 metres of any surface waterway;

   iii. Onto ground with no vegetative cover;

   iv. Onto ground where surface ponding is occurring; and

   v. There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours.

c. The consent holder shall prepare a Landscape Plan and shall provide it to the Canterbury Regional Council, Attn: RMA Compliance and Enforcement Manager prior to the commencement of planting confirming that the planting is consistent with the requirements of the Department of Public Health Public Health Services 1992 Guideline or its successor. The Landscape Plan shall include, but not be limited to, the following information:

   i. The location and extent of each area of shelter planting.

   ii. The species to be planted and the anticipated height of each plant following establishment.

   iii. The minimum plant size and spacing required at planting to achieve the minimum plant height defined in clause (b) of this condition prior to the commencement of wastewater spray irrigation.

d. Once established the landscaping shall be maintained for the duration of the exercise of the consent, with any dead, dying or diseased plants being replaced within one growing season within plants of a similar species and in accordance with the planting specified in the Landscape Plan required under clause (c).

Compliance Report:
Not monitored

---

15 a. The discharge area shall be fenced to prevent stock, vehicle and public access.

b. At either end of the discharge area along Burnham School Road an easy visible sign should state " Potential Health Risks from Aerosolised treated sewage in this area".

Compliance Report:
Complies

The discharge area is well fenced and the gates to each area locked. Signage with the required statement is present at either end of the discharge area.

16 A notice shall be erected and maintained at all entrances to the site. This notice shall be legible at a distance of five (5) metres and shall inform the public of the nature of the activities occurring at the site, and that the disposal or waste by any other person is prohibited.

Compliance Report:
Complies

17 The discharge shall be managed to ensure that:

a. Aerosols and spray-drift arising from the discharge do not cause offensive or objectionable effects beyond the boundary of the discharge area.

b. Any odour resulting from spray irrigation of wastewater shall not result in offensive or objectionable effects on the environment beyond the boundary of the irrigated area.

Compliance Report:
Complies

During my site visit I observed the discharge from CP1, the discharge did not result in any odour or aerosols that would be considered to be offensive and/or objectionable beyond the boundary of the discharge area.

Please note, an odour was substantiated during this site visit, however the odour was determined to originate from the drying room not from the discharge and therefore has been graded CRC040100.1.

18

a. All parts of the discharge area receiving wastewater shall be operated as a cut and carry operation.

b. There shall be no harvesting of crops within 48 hours of any wastewater irrigation.

c. All pasture harvested from the irrigation areas shall be removed for off-site disposal.

Compliance Report:
Complies

All parts of the discharge area currently receiving wastewater are operated as a cut and carry operation. All pasture harvested is removed off-site (generally to the neighbouring farm) for disposal.

19 A Management Plan shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, at least two (2) months prior to the exercise of this consent. The Management Plan shall:

a. Set out how the activity authorised by this consent shall be operated to enable compliance with the consent conditions.

b. Be maintained at all times and any changes to the Management Plan shall be submitted to the Canterbury Regional Council prior to those changes taking effect.

Compliance Report:
Complies

A revised Management Plan (30/07/2019) has been completed by Stantec and provided by SDC (INT REF# C19C/125351)

---

20 The Management Plan referred to in Condition 19 shall include, but not be limited to, the following:

a. The method of sampling chemicals, quantities of wastewater and frequency of sampling throughout the operation.

b. The testing and calibration of all systems including backup generator, telemetry, and flow meters.

c. Sub-condition cancelled.

d. The monthly monitoring programme of the onsite bores identified on Plan CRC153952C.

Compliance Report:
Not monitored

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21 The discharge shall be sampled from the irrigation pump chamber once per month and analysed for the following:

a. Biochemical Oxygen Demand.

b. Total Suspended Solids.

c. Total Kjeldahl Nitrogen.

d. Ammoniacal Nitrogen.

e. Faecal coliforms.

Compliance Report:
Complies

The discharge is sampled and the results have been provided (INT REF# C20C/16502).

---

22 Daily records shall be kept of the following:

a. The volume of wastewater applied to land.

b. The irrigation zone over which the discharge is applied.

c. The depth of the application of wastewater.

Compliance Report:
Not monitored

These records are provided as part of the annual report due June 2020.

---

23 Monthly records shall be kept of the following:

a. The total volume of wastewater applied.

b. The total depth of wastewater applied.

c. The average effluent hydraulic loading rate.

d. The nitrogen loading rate (expressed as kilograms of nitrogen per hectare).

e. The mean dry weight of pasture removed from the site.

Compliance Report:
Not monitored

These records are provided as part of the annual report due June 2020.

---

24 Prior to the exercise of the consent, the consent holder shall review and update as necessary the 'Excursion Response Plans' (ERP) included in the application to be consistent with the conditions of consent, and submit a copy of the revised ERP to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager. Thereafter the ERP shall be maintained at all times and any changes to the ERP shall be submitted to the Canterbury Regional Council prior to those changes taking effect.

Compliance Report:
Complies

An Excursion Response Plan was provided in 2016 (int ref #C16C/15733). A copy of the ERP can also be found within the recently revised Management Plan (C19C/125351).

---

25 For the purposes of monitoring the effects of the discharge on groundwater quality, in reference to the bores identified in condition (20):

a. The consent holder shall establish and maintain a minimum of three (3) on-site monitoring bores located down-gradient of the irrigation area and two (2) on-site monitoring bores located up-gradient of the irrigation area for the duration of this consent.

b. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall have screened sections extending from two (2) metres below the lowest water level to one (1) metre above the highest water level.

c. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall be sampled and analysed at least monthly for nitrate nitrogen and Faecal coliform:

d. In the event that the:

i. concentration of nitrate nitrogen in any of the groundwater samples collected from the down-gradient monitoring bores referred to in clause (a) of this condition exceeds eight (8) milligrams per litre and is at least 30 per cent greater than the nitrate nitrogen concentration in the up-gradient bores also referred to in clause (a) of this condition; or

ii. Faecal coliforms exceeds 50 coliform forming units (cfu)/ per 100 millilitres in any of the monitoring bores established in accordance with clause (a) of this condition;

Then the consent holder shall follow the response procedure outlined in the Excursion Response Plan.

Compliance Report:

Non-compliance Action required

a. As discussed during our meeting with groundwater scientist Fouad Alkhaier on the 24.07.2019 the CP on the corner of Burnham Road and Brookside Road is not well covered by a suitable downgradient bore. I understand from our discussions on site SDC is looking to install a down gradient bore to capture this pivot when upgrading the bores to achieve compliance with Condition 25(b). Can you please advise of a timeframe for completion of these works.

b. As per the previous compliance report, the nearest groundwater level monitoring bore (M36/0465) is located 1km south of the wastewater disposal area. Groundwater this year is reported to be at a depth of -5m RGL. The minimum groundwater level is -9.6 RGL and maximum -3.3m RGL. Therefore, the groundwater monitoring bores noted in Condition 25(a) should be screened from 2m below the lowest water level (i.e approx 11.6m) and 1m above the highest water level (i.e. approx. 2.3m). Although I understand Sicon is conducting water level measurements on site in an attempt to gain a better understanding of the maximum and minimum groundwater levels. I have detailed the depth and screened sections of each of the monitoring bores below. Based on this information, I do not believe these bores meet the requirement of Condition 25(b). I understand SDC is in the process of commissioning the drilling of a series of additional bores to meet compliance with this condition. Until such time as these

bores are drilled and being actively monitored compliance has not been achieved therefore this condition will continue to be graded as non-compliant. I would appreciate it if you could provide a timeframe for having the new bores operational.

Upgradient

BX23/0204 = 22.5m (screened 18m - 21m)
BX23/0205 = 24m (screened 21m - 24m)
BX23/0878 = 18m (screened 6m - 18m)

Downgradient

BX23/0206 = 13.9m (screened 8.9m - 13.9m)
BX23/0207 = 14m (screened 9m - 12m)
M36/7464 = 16.5m (screened 7.5m to 16.5m)
BX23/0208 = 17m (screened 11m to 14m)

c. Groundwater is sampled and analysed at least monthly for nitrate nitrogen and faecal coliforms.

d. The samples collected from the down gradient bores did not exceed the limits at any time during the past 6 months.

---

26 For the purposes of monitoring the effects of the discharge on soils:

a. Samples of soil shall be collected twice annually from the land beneath each centre pivot irrigator or k-line irrigation area that has received treated wastewater irrigation in the previous six (6) months.

b. Sampling shall occur between a depth of zero (0) and 50 millimetres.

c. A minimum of four (4) samples shall be taken from each area sampled and all samples from the wastewater irrigation site shall be combined into a single composite sample and be analysed for the following:

i. Total cadmium

ii. Total chromium

iii. Total copper

iv. Total lead

v. Total nickel

vi. Total zinc

vii. Total nitrogen

viii. Total mercury

ix. Total arsenic

Compliance Report:
Not monitored

This condition will be monitored upon receipt of the annual report in June 2020.

---

27 a. If any of the results of any of the analysed samples in accordance with condition 26 exceed the thresholds specified in clause (b) of this condition the consent holder shall:

i. Cease wastewater irrigation over that irrigation area.

ii. Advise the Canterbury Regional Council within ten (10) days of the receipt of the results, and outline the steps taken to address elevated soil concentrations, including any remediation or mitigation measures.

iii. Not recommence wastewater irrigation over that irrigation area until further sampling demonstrates to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, compliance with the thresholds specified in clause (b) of this condition.

b.

c.

Trace Element	Limit (milligrams per kilogram) dry weight
Total Cadmium	1
Total Chromium	600
Total Copper	100
Total Lead	300
Total Nickel	60
Total Zinc Total Mercury	300 1
Total Arsenic	20

Compliance Report:
Not monitored

---

28 All samples required under this consent shall be taken by a suitably qualified and experienced person, and shall be analysed using methods approved by the American Public Health Association or the American Society for the Testing of Materials by a laboratory that is accredited for that method of analysis by International Accreditation New Zealand (IANZ) or by an organisation with a mutual agreement with IANZ.

Compliance Report:
Not monitored

29 The results of all samples taken under this consent shall be provided to the Canterbury Regional Council within ten (10) working days of receipt of the samples.

30 The consent holder shall provide the Canterbury Regional Council with an Annual Monitoring Report each year commencing 12 months from the date of the exercise of this consent. The Annual Monitoring Report shall include, but not be limited to:

a. Monthly monitoring records.

b. All sampling results required under the conditions of consent.

c. Annual average nitrogen loading rate.

d. A record of any complaints from members of the public and actions taken.

e. Status of compliance with consent conditions.

f. Reasons for any non-compliances and actions taken or planned to prevent re-occurrences.

This report shall then become the formal record of results for that year.

Compliance Report:
Not monitored

This condition will be monitored upon receipt of the annual report in June 2020.

31 a. Prior to the construction of the Pines Wastewater Treatment Facility, design plans shall be certified by a Chartered Professional Engineer (CPEng) with at least five (5) years experience in the design and construction of wastewater treatment systems to confirm that the system has been suitably designed to achieve or better the values set out in Condition 10(a).

b. A copy of the certified design plans shall be submitted to the Canterbury Regional Council, Attention: Environmental Compliance Manager, at least one month prior to construction.

32 a. Prior to the exercise of this consent, the consent holder shall establish a reticulated water supply which provides sufficient water to cover the property

holders domestic needs to the properties located within the area bound by Brookside Road, Ellesmere Junction Road and Edwards Road.

b. The consent holder shall maintain the reticulated supply for the duration of this consent and ensure the quality of water supplied complies with New Zealand Drinking Water Standards 2008 criteria.

Compliance Report:
Complies

Based on the maps provided, the reticulated supply runs north to south down Burnham Road up to and including property 99. The full extent of Ellesmere Junction Road, Brookside Road and Edwards Road as required have a reticulated supply available to them. The maps are available at (C19C/21968).

---

33 a. In the event of any disturbance of Koiwi Tangata (human bones) or taonga (treasured artefacts), during the construction or installation of the treatment and disposal facilities, the consent holder shall immediately:

i. Cease earthmoving operations in the affected area

ii. Mark off the affected area until earthmoving operations recommence

iii. Advise the Canterbury Regional Council of the disturbance

iv. Advise the Upoko Runanga of Te Taumutu Runanga, or their representative (contact information can be obtained from the Canterbury Regional Council), and the New Zealand Historic Places Trust, of the disturbance.

b. Earthmoving equipment operations shall not recommence until either;

i. the consent holder provides a certificate in writing to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, signed by Upoko Runanga of Taumutu, or their representative(s), stating that appropriate action has been undertaken in relation to the discovered culturally sensitive material; or

ii. after five (5) working days after advising the Taumutu Runanga, a certificate signed by an archaeologist (i.e., a person with a post graduate degree in archaeology, and who is a member of the New Zealand Archaeological Association) is provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that states that in the archaeologist's opinion appropriate action has been undertaken in relation to the discovered culturally sensitive material. That certificate shall detail the action that has been undertaken by the consent holder. A copy of the archaeologist's qualifications shall also be provided with any such certificate.

Compliance Report:
Not operational

---

34 The lapsing provisions of Section 125 of the Resource Management Act 1991 shall not apply to this consent until 31 March 2030.

Compliance Report:
Not operational

---

35 The Canterbury Regional Council may, once per year, on any of the last five (5) working days of March or September serve notice of its intention to review the conditions of this consent for the purposes of either of the following:

a. Dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.

b. Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

---

36 When discharging wastewater to land adjacent to the Plan Change land, the consent holder shall ensure that:

a. The discharge shall be in an aerobic state.

b. The dissolved oxygen concentration shall not be less that a trigger level of 0.5 grams per cubic metre.

c. The dissolved oxygen concentration in the discharge shall be continuously monitored and an alarm fitted that activates in the event that the dissolved oxygen concentration is less than the trigger level in clause (b) of this condition.

d. The dissolved oxygen monitoring device shall be calibrated and serviced annually.

Compliance Report:
Complies

Based on the information provided in the annual report DO levels do not exceed the consented trigger limit of 0.5 grams per cubic meter. Do levels are continuously monitored at the site. According to Chris, the DO meter is calibrated and service annually.

---

37 The requirements of Conditions 36(c) and 36(d) shall be undertaken by the consent holder for a minimum of at least two (2) years from the date of commencement of spray irrigation of wastewater to land in accordance with this consent.

38 The requirements of Conditions 36(c) and 36(d) shall no longer apply upon provision of a certificate signed by the person responsible for designing the wastewater irrigation system, or by a chartered Professional Engineer (CPEng), to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, certifying that;

a. dissolved oxygen in the discharge has been continuously monitored for at least two (2) years; and

b. the minimum level of dissolved oxygen concentration specified in Condition 36(b) has been continuously met or exceeded during that two (2) year period.

39 If the minimum level of dissolved oxygen concentration specified in Condition 36(b) is breached, or the median concentration of faecal coliforms is greater than 500 colony forming units per 100 millilitre sample, then the following provisions shall apply:

a. Any discharge of treated wastewater to land adjacent to the Plan Change land shall be setback no less that 200 metres from the common boundary as shown on Plan CRC101109.1C when the winds of any strength are from 170°N to 310°N; provided that

b. When the winds are not from 170°N to 310°N any discharge of treated wastewater shall comply with the setback distances prescribed by Condition 40.

Compliance Report:

Complies

CP5 is fitted with an alarm in the event of low DO within the CP5 prohibited zone. Further to this, the pivot is programmed to cease the discharge while it moves outside of the specified zone. The required separation distance from the residential land boundary of >200 m is adhered to E.Coli sampling results provided as part of the annual report show results of less than 500CFU/100ml sample. The pivots are fitted with valves and actuators to allow the outer sprinklers to be shut off as the pivot approaches the property boundary's associated with Plan Change 8.

40 In respect of shelter belt planting:

a. The consent holder shall establish a shelter belt comprising three rows of closely planted evergreen trees along the common boundary defined under Condition 39(a).

b. No discharge of treated wastewater to land shall occur within 150 metres of that common boundary until;

i. the trees referred to in Condition 40(a) have reached a consistent minimum height of three (3) metres and have developed into a dense continuous shelter belt without gaps; and

ii. the consent holder has demonstrated to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that the boundary plantings comply with Condition 40(b)(i).

c. Following confirmation pursuant to condition 40(b)(ii), discharge of treated wastewater to land may occur up to 25 metres from the common boundary defined under Condition 39(a).

---

41 There shall be no end guns associated with the wastewater spray irrigation system located on Pt Lot 1 DP 65117 or Pt RS 33357, being that part of the land subject to this consent located north or Burnham School Road.

Compliance Report:
Complies

There are no end guns on this pivot.

---

42 In the event of cessation of irrigation from the wastewater spray irrigation system for more than 24 hours on land adjacent to the Plan Change land, the consent holder shall not start up irrigation from the spray irrigation system within 200 metres of the common boundary defined under Condition 39(a).

---

43 No discharge of treated wastewater to land from a spray irrigation system shall occur within 150 metres of the common boundary defined under Condition 38(i) unless:

a. The spray nozzles are no more than two (2) metres above ground level.

b. The spray nozzles produce large consistent droplets such as produced by the Nelson R3000 brand or similar product.

c. The operating pressure at the spray irrigation nozzle does not exceed 103 kilopascals (kPA).

Compliance Report:
Complies

The centre pivot in this area is fitted with R3000 nozzles. Amit informed me they are designed to achieve a maximum pressure of 100kPa. The nozzles are within 2m of the ground level.

General comments

On the 12th of December 2019 I visited the The Pines WWTP. On site I met with Amit Chauhan (SDC) and Chris Salkeld (Sicon). Thank you both for assisting me with my visit.

If you have any queries regarding this compliance monitoring report or your resource consent, please feel free to contact me on 027 578 0947.

Date Inspected: 10 Jan 2020

Monitored By: Trinity White

Signature: _____

Senior RMO Compliance Monitoring & Incident Response - Christchurch West Melton

General information

Canterbury Regional Council Obligations

Under Section 35 of the Resource Management Act 1991, the Canterbury Regional Council has a duty to monitor all resource consent exercised within its region, to make sure all the conditions are being complied with.

Monitoring Frequency

The frequency with which your consent is monitored will vary according to the type of activity your consent authorises, the conditions imposed and the extent to which you have complied with these conditions on previous visits. **If you fully comply with all conditions then frequency will reduce to the minimum set for the activity.**

Costs

It is the Council's policy to recover all actual and reasonable costs of compliance monitoring of resource consents.

From:	Trinity White
To:	"Amit Chauhan"
Subject:	CRC153952 The Pines - proposed upgrades, stockwater race closure & nitrate monitoring
Date:	Friday, 17 August 2018 4:35:00 PM
Attachments:	image002.jpg

Hello Amit,

Thank you for meeting with me today, I appreciate you involving ECan with your future plans for The Pines.

As promised, I will seek further guidance on today's proposals and get back to you.

I wanted to follow up on a couple of the items we discussed today.

As discussed on site, there are a number of occurrences where the nitrate results have been in breach of condition 25 of CRC153952. During our discussion you stated a previous monitoring officer had allowed for exceedances to not be determined as non-compliant based on a suspected unrepresentative upstream sample bore. Could you please provide supporting documentation. Importantly, I note some of these results are above the Ministry of Health Drinking Water (2008) MAV of 11.3 mg/L of nitrate. Can you please confirm if the ERP was initiated when these results were noted? In particular have downstream users been notified of any of these exceedances?

During our drive to inspect the shelterbelts near CP5 I note there is a stockwater race that has not been piped or closed in accordance with Condition 12 of CRC153952. The area of race in question can be seen marked in red on the map below.

Kind regards,

Trinity

From: Amit Chauhan
To: Trinity White
Subject: RE: CRC153952 The Pines compliance questions
Date: Wednesday, 7 August 2019 12:59:28 PM
Attachments: image001.jpg
selwyn district Council CRC153952 (The Pines WWTP) Compliance Report - 6....pdf
2038901-SP-1.pdf
2043988-SP-1.pdf
2048852-SP-1.pdf
2064225-SP-1.pdf
2072189-SP-1 (002).pdf
2077755-SP-1.pdf
2077767-SP-1.pdf
2083352-SP-1 (003).pdf
2099313-SP-1 (002).pdf
2102885-SP-1.pdf
2103582-SP-1.pdf
2110227-SP-1.pdf
2115765-SP-1.pdf
2115766-SP-1.pdf
2120197-SP-1.pdf
Rolleston Pines Soil Results_ltr_29July2019.pdf
Hill Labs Organic Sampling_July2019.pdf
Hill Labs Metals Sampling_July2019.pdf

Hi Trinity,

Condition 9 – Which is the correct 95th percentile record?

> Appendix D of the annual report shows the 95th Percentile ecoli to be 2380 cfu/100ml. Where Table 3.5 of the annual report shows the 95th percentile ecoli to be 1560 cfu/100ml. Both are non-compliant with the upper limit being 1000 cfu/100ml. The annual report states the upper compliance limit is 10,000 cfu/100ml, this is incorrect.

Yes, you are right, thanks for bringing this up, this was a typo error, we have made the correction in the report. (attached for your reference) apologies for the oversight.

Victors note attached for your info.

"Both numbers are correct. Table 3.5 is a summary of the average monthly figures whereas Appendix D is based on the actual (unaveraged) sampling results. Table 3.5 was used to provide a summary and reference is made to Appendix D for the details. I can delete Table 3.5 and just make reference to Appendix D as the condition does not require averaging.

The 10,000 is a typo error and a complete oversight. It should be 1,000 in which case the 95% percentile requirement is not complied with."

Further, as mentioned in the report, we have identified the root cause for the elevated FC's to the stagnation of the water in the sampling tap extension pipe. Since there is no residual disinfection, there is likelihood of FC growth in the pipe and reflected in some samples. The purging that was being carried out was found to be inadequate and we believe the location and geometry of the sample point was not a true representation of the water discharged from the treated water tank. We have changed the location of the tap and brought it closer to the discharge pumps. We do have a maintenance schedule for the wet well to keep it in good condition and have made few improvements to discourage the algal growth. This should help us further with managing the condition 9.

Condition 25 – Can you please provide detail/evidence that the ERP was followed for the nitrate exceedances seen below (seen in red).

The ERP sampling results are attached.

Condition 26 – Can you please provide the raw data for these sample results? From the annual report it does not appear that 4 samples are taken from each irrigation area twice per year.

Aqualinc does the sampling. The sampling procedure includes taking four samples in each pivot and then these samples are blended before analysing. (latest sampling results attached)

Kind regards

Amit

From: Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx>
Sent: Monday, 5 August 2019 12:11 PM
To: Trinity White <xxxxxxx.xxxxx@xxxx.xxxx.xx>
Subject: PINES INFLOWS190805 1203.xls

Hi Trinity,

Please find attached the inflows at Pines.

Regards

Amit

2 Norman Kirk Drive, Rolleston 7614
PO Box 90, Rolleston 7643
Phone: (03) 347-2800 or (03) 318-8338
Fax: (03) 347-2799
www.selwyn.govt.nz | www.selwynlibraries.co.nz
www.selwyn.getsready.net

Trinity White
RMO II Monitoring & Compliance
Environment Canterbury
Christchurch Office

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Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2110237 SPv1
Contact:	Lisa Shaw	**Date Received:**	17-Jan-2019
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	22-Jan-2019
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	EWS: ERP BX23/0206
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		21605 - BX23/0206 17-Jan-2019 9:32 am				
Lab Number:		2110237.1				
Nitrite-N	g/m³	< 0.10	-	-	-	-
Nitrate-N	g/m³	8.7	-	-	-	-
Nitrate-N + Nitrite-N	g/m³	8.7	-	-	-	-

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
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
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser, screen level. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.10 g/m³	1

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

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

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.

Ara Heron BSc (Tech)
Client Services Manager - Environmental

ilac-MRA IANZ ACCREDITED LABORATORY

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

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W www.hill-laboratories.com

Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2115765 SPv1
Contact:	Lisa Shaw	**Date Received:**	29-Jan-2019
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	31-Jan-2019
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	Pines Bores - Monthly
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		M36/7461 29-Jan-2019 11:21 am	M36/7462 29-Jan-2019 11:46 am	M36/7463 29-Jan-2019 12:16 pm	M36/7464 29-Jan-2019 10:25 am	M36/7667 29-Jan-2019 12:01 pm
Lab Number:		2115765.1	2115765.2	2115765.3	2115765.4	2115765.5
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Nitrate-N	g/m³	3.8	4.3	0.90	5.7	1.42
Nitrate-N + Nitrite-N	g/m³	3.8	4.3	0.90	5.7	1.42
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1

Sample Name:		M36/7668 29-Jan-2019 12:10 pm	M36/20415 29-Jan-2019 12:41 pm	M36/20416 29-Jan-2019 12:26 pm	BX23/0204 29-Jan-2019 11:06 am	BX23/0205 29-Jan-2019 10:51 am
Lab Number:		2115765.6	2115765.7	2115765.8	2115765.9	2115765.10
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	0.179	4.0
Nitrate-N	g/m³	0.83	3.6	4.9	5.0	2.2
Nitrate-N + Nitrite-N	g/m³	0.83	3.6	4.9	5.1	6.2
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1

Sample Name:		BX23/0207 29-Jan-2019 10:08 am	BX23/0208 29-Jan-2019 10:34 am	BX23/0206 29-Jan-2019 9:51 am		
Lab Number:		2115765.11	2115765.12	2115765.13		
Individual Tests						
Nitrite-N	g/m³	0.077	0.004	< 0.10	-	-
Nitrate-N	g/m³	3.5	8.1	8.6	-	-
Nitrate-N + Nitrite-N	g/m³	3.6	8.1	8.7	-	-
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	-	-
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #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

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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.	-	1-13
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	1-12
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	13
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1-13
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	1-12
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser, screen level. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.10 g/m³	13
Faecal Coliforms and E. coli profile			
Faecal Coliforms	Membrane Filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation Analysed at Hill Laboratories - Microbiology; 101c Waterloo Road, Hornby, Christchurch. APHA 9222 D 23rd ed. 2017.	1 cfu / 100mL	1-13
Escherichia coli	Membrane filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation Analysed at Hill Laboratories - Microbiology; 101c Waterloo Road, Hornby, Christchurch. APHA 9222 G 23rd ed. 2017.	1 cfu / 100mL	1-13

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

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

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Graham Corban MSc Tech (Hons)
Client Services Manager - Environmental

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Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2115766 SPv1
Contact:	Lisa Shaw	**Date Received:**	29-Jan-2019
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	07-Feb-2019
	PO Box 7469	**Quote No:**	34191
	Christchurch 8240	**Order No:**	
		Client Reference:	Pines Bores- Quarterly
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		M36/7461 29-Jan-2019 11:20 am	M36/7462 29-Jan-2019 11:45 am	M36/7463 29-Jan-2019 12:15 pm	M36/7464 29-Jan-2019 10:24 am	M36/7667 29-Jan-2019 12:00 pm
Lab Number:		2115766.1	2115766.2	2115766.3	2115766.4	2115766.5
Individual Tests						
pH	pH Units	6.9	6.8	6.9	6.9	6.9
Electrical Conductivity (EC)	mS/m	25.5	26.9	42.2	34.2	44.4
Chloride	g/m³	22	17.6	37	32	38
Total Nitrogen	g/m³	3.9	5.1	1.04	6.0	1.65
Total Ammoniacal-N	g/m³	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Nitrate-N	g/m³	3.8	5.0	0.88	5.8	1.43
Nitrate-N + Nitrite-N	g/m³	3.8	5.0	0.88	5.8	1.43
Total Kjeldahl Nitrogen (TKN)	g/m³	0.12	< 0.10	0.16	0.16	0.22
Total Phosphorus	g/m³	0.24	0.171	0.154	0.006	0.012
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1

Sample Name:		M36/7668 29-Jan-2019 12:09 pm	M36/20415 29-Jan-2019 12:40 pm	M36/20416 29-Jan-2019 12:25 pm	BX23/0204 29-Jan-2019 11:05 am	BX23/0205 29-Jan-2019 10:50 am
Lab Number:		2115766.6	2115766.7	2115766.8	2115766.9	2115766.10
Individual Tests						
pH	pH Units	6.7	6.9	6.5	6.9	7.0
Electrical Conductivity (EC)	mS/m	44.9	32.1	41.8	22.9	20.8
Chloride	g/m³	39	27	38	21	17.1
Total Nitrogen	g/m³	1.12	3.9	4.7	5.5	6.7
Total Ammoniacal-N	g/m³	< 0.010	< 0.010	0.045	0.019	0.013
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	0.129	3.9
Nitrate-N	g/m³	0.82	3.5	4.1	5.0	2.5
Nitrate-N + Nitrite-N	g/m³	0.82	3.5	4.1	5.1	6.4
Total Kjeldahl Nitrogen (TKN)	g/m³	0.30	0.33	0.63	0.32	0.34
Total Phosphorus	g/m³	0.022	0.084	1.28	< 0.004	< 0.004
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1

Sample Name:	BX23/0206 29-Jan-2019 9:50 am	BX23/0207 29-Jan-2019 10:07 am	BX23/0208 29-Jan-2019 10:33 am		
Lab Number:	2115766.11	2115766.12	2115766.13		

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Sample Type: Aqueous						
Sample Name:		BX23/0206 29-Jan-2019 9:50 am	BX23/0207 29-Jan-2019 10:07 am	BX23/0208 29-Jan-2019 10:33 am		
Lab Number:		2115766.11	2115766.12	2115766.13		
Individual Tests						
pH	pH Units	7.2	7.2	7.1	-	-
Electrical Conductivity (EC)	mS/m	32.1	31.3	36.6	-	-
Chloride	g/m^3	26	27	33	-	-
Total Nitrogen	g/m^3	8.8	2.8	8.4	-	-
Total Ammoniacal-N	g/m^3	0.081	0.016	< 0.010	-	-
Nitrite-N	g/m^3	0.003	0.175	0.017	-	-
Nitrate-N	g/m^3	8.5	2.4	8.1	-	-
Nitrate-N + Nitrite-N	g/m^3	8.5	2.6	8.2	-	-
Total Kjeldahl Nitrogen (TKN)	g/m^3	0.27	0.21	0.22	-	-
Total Phosphorus	g/m^3	0.006	0.014	0.004	-	-
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	-	-
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #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.	-	1-13
pH	pH meter. Analysed at Hill Laboratories - Chemistry; 101c Waterloo Road, Christchurch. APHA 4500-H^+ B 23rd ed. 2017. Note: It is not possible to achieve the APHA Maximum Storage Recommendation for this test (15 min) when samples are analysed upon receipt at the laboratory, and not in the field. Samples and Standards are analysed at an equivalent laboratory temperature (typically 18 to 22 °C). Temperature compensation is used.	0.1 pH Units	1-13
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	1-13
Chloride	Filtered sample from Christchurch. Ion Chromatography. APHA 4110 B (modified) 23rd ed. 2017.	0.5 g/m^3	1-13
Total Nitrogen	Calculation: TKN + Nitrate-N + Nitrite-N. Please note: The Default Detection Limit of 0.05 g/m^3 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/m^3, the Default Detection Limit for Total Nitrogen will be 0.11 g/m^3.	0.05 g/m^3	1-13
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/m^3	1-13
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/m^3	1-13
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m^3	1-13
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/m^3	1-13
Total Kjeldahl Nitrogen (TKN)	Total Kjeldahl digestion, phenol/hypochlorite colorimetry. Discrete Analyser. APHA 4500-N_{org} D (modified) 4500 NH_3 F (modified) 23rd ed. 2017.	0.10 g/m^3	1-13

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Total Phosphorus	Total phosphorus digestion, ascorbic acid colorimetry. Discrete Analyser. APHA 4500-P B & E (modified from manual analysis and also modified to include a reductant to reduce interference from any arsenic present in the sample) 23rd ed. 2017. NWASCO, Water & soil Miscellaneous Publication No. 38, 1982.	0.004 g/m^3	1-13
Faecal Coliforms and E. coli profile			
Faecal Coliforms	Membrane Filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation Analysed at Hill Laboratories - Microbiology; 101c Waterloo Road, Hornby, Christchurch. APHA 9222 D 23rd ed. 2017.	1 cfu / 100mL	1-13
Escherichia coli	Membrane filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation Analysed at Hill Laboratories - Microbiology; 101c Waterloo Road, Hornby, Christchurch. APHA 9222 G 23rd ed. 2017.	1 cfu / 100mL	1-13

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Client Services Manager - Environmental

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Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2038901 SPv1
Contact:	Lisa Shaw	**Date Received:**	28-Aug-2018
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	03-Sep-2018
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	Pines Bores - Monthly
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		M36/7461 28-Aug-2018 8:38 am	M36/7462 28-Aug-2018 8:50 am	M36/7463 28-Aug-2018 9:23 am	M36/7464 28-Aug-2018 10:20 am	M36/7667 28-Aug-2018 9:00 am
Lab Number:		2038901.1	2038901.2	2038901.3	2038901.4	2038901.5
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	< 0.002	0.003
Nitrate-N	g/m³	2.4	3.4	1.46	3.7	1.51
Nitrate-N + Nitrite-N	g/m³	2.4	3.4	1.46	3.7	1.51
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1

Sample Name:		M36/7668 28-Aug-2018 9:10 am	M36/20415 28-Aug-2018 9:43 am	M36/20416 28-Aug-2018 9:35 am	BX23/0204 28-Aug-2018 8:23 am	BX23/0205 28-Aug-2018 8:10 am
Lab Number:		2038901.6	2038901.7	2038901.8	2038901.9	2038901.10
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	0.82	1.15
Nitrate-N	g/m³	0.57	4.3	3.5	3.0	4.1
Nitrate-N + Nitrite-N	g/m³	0.57	4.3	3.5	3.8	5.2
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	1 #1	< 1 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	1 #1	< 1 #1	< 1 #1	< 1 #1

Sample Name:		BX23/0207 28-Aug-2018 10:27 am	BX23/0208 28-Aug-2018 10:07 am	BX23/0206 28-Aug-2018 10:40 am		
Lab Number:		2038901.11	2038901.12	2038901.13		
Individual Tests						
Nitrite-N	g/m³	2.4	0.26	< 0.10	-	-
Nitrate-N	g/m³	0.81	2.6	8.4	-	-
Nitrate-N + Nitrite-N	g/m³	3.2	2.8	8.5	-	-
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	-	-
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #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.

Sample Type: Aqueous

Test	Method Description	Default Detection Limit	Sample No

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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.	-	1-13
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m³	1-12
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser, screen level. APHA 4500-NO3- I 22nd ed. 2012 (modified).	0.10 g/m³	13
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1-13
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m³	1-12
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser, screen level. APHA 4500-NO3- I 22nd ed. 2012 (modified).	0.10 g/m³	13
Faecal Coliforms and E. coli profile			
Faecal Coliforms	Membrane Filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation Analysed at Hill Laboratories - Microbiology; 101c Waterloo Road, Hornby, Christchurch. APHA 9222 D, 22nd ed. 2012.	1 cfu / 100mL	1-13
Escherichia coli	Membrane filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation Analysed at Hill Laboratories - Microbiology; 101c Waterloo Road, Hornby, Christchurch. APHA 9222 G, 22nd ed. 2012.	1 cfu / 100mL	1-13

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Client Services Manager - Environmental

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Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2043588 SPv1
Contact:	Lisa Shaw	**Date Received:**	05-Sep-2018
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	11-Sep-2018
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	Extra Nitrates Test/ Pines Bores
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		19515 - BX23/0205 05-Sep-2018 12:10 pm	19516 - BX23/0204 05-Sep-2018 12:18 pm	19517 - BX23/0206 05-Sep-2018 12:30 pm		
Lab Number:		2043588.1	2043588.2	2043588.3		
Nitrite-N	g/m³	0.38	0.005	< 0.002	-	-
Nitrate-N	g/m³	6.3	6.2	8.7	-	-
Nitrate-N + Nitrite-N	g/m³	6.7	6.2	8.7	-	-

Summary of Methods

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

Sample Type: 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
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m³	1-3
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 22nd ed. 2012 (modified).	0.002 g/m³	1-3

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

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

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Martin Cowell - BSc
Client Services Manager - Environmental

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Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2048852 SPv1
Contact:	Lisa Shaw	**Date Received:**	14-Sep-2018
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	19-Sep-2018
	PO Box 7469	**Quote No:**	42384
	Christchurch 8240	**Order No:**	
		Client Reference:	EWS-Nitrates
		Submitted By:	Liane Burt

Sample Type: Aqueous

Sample Name:		19690 - BX23/0206 14-Sep-2018 3:02 pm				
Lab Number:		2048852.1				
Nitrite-N	g/m³	< 0.002	-	-	-	-
Nitrate-N	g/m³	8.5	-	-	-	-
Nitrate-N + Nitrite-N	g/m³	8.5	-	-	-	-

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
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m³	1
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m³	1

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Ara Heron BSc (Tech)
Client Services Manager - Environmental

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Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2054225 SPv1
Contact:	Lisa Shaw	**Date Received:**	25-Sep-2018
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	27-Sep-2018
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	Pines Bores - Monthly
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		M36/7461 25-Sep-2018 10:00 am	M36/7462 25-Sep-2018 10:10 am	M36/7463 25-Sep-2018 10:15 am	M36/7464 25-Sep-2018 11:27 am	M36/7667 25-Sep-2018 10:25 am
Lab Number:		2054225.1	2054225.2	2054225.3	2054225.4	2054225.5
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Nitrate-N	g/m³	1.61	2.0	2.1	4.0	3.9
Nitrate-N + Nitrite-N	g/m³	1.61	2.0	2.1	4.0	3.9
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1

Sample Name:		M36/7668 25-Sep-2018 10:20 am	M36/20415 25-Sep-2018 10:40 am	M36/20416 25-Sep-2018 10:35 am	BX23/0204 25-Sep-2018 11:05 am	BX23/0205 25-Sep-2018 10:55 am
Lab Number:		2054225.6	2054225.7	2054225.8	2054225.9	2054225.10
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	< 0.002	0.025
Nitrate-N	g/m³	0.68	3.9	3.2	5.9	7.1
Nitrate-N + Nitrite-N	g/m³	0.68	3.9	3.2	5.9	7.2
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	16 #1	56	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	15 #1	44	< 1 #1	< 1 #1

Sample Name:		BX23/0207 25-Sep-2018 11:22 am	BX23/0208 25-Sep-2018 11:30 am	BX23/0206 25-Sep-2018 11:15 am		
Lab Number:		2054225.11	2054225.12	2054225.13		
Individual Tests						
Nitrite-N	g/m³	0.76	0.015	< 0.10	-	-
Nitrate-N	g/m³	2.7	0.017	8.5	-	-
Nitrate-N + Nitrite-N	g/m³	3.5	0.032	8.6	-	-
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	1 #1	< 1 #1	-	-
Escherichia coli	cfu / 100mL	< 1 #1	1 #1	< 1 #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

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The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which are not accredited.

Sample Type: 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.	-	1-13
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m³	1-12
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser, screen level. APHA 4500-NO3- I 22nd ed. 2012 (modified).	0.10 g/m³	13
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1-13
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m³	1-12
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser, screen level. APHA 4500-NO3- I 22nd ed. 2012 (modified).	0.10 g/m³	13
Faecal Coliforms and E. coli profile			
Faecal Coliforms	Membrane Filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation Analysed at Hill Laboratories - Microbiology; 101c Waterloo Road, Hornby, Christchurch. APHA 9222 D, 22nd ed. 2012.	1 cfu / 100mL	1-13
Escherichia coli	Membrane filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation Analysed at Hill Laboratories - Microbiology; 101c Waterloo Road, Hornby, Christchurch. APHA 9222 G, 22nd ed. 2012.	1 cfu / 100mL	1-13

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

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

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Client Services Manager - Environmental

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Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2072189 SPv1
Contact:	Lisa Shaw	**Date Received:**	30-Oct-2018
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	01-Nov-2018
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	Pines Bores - Monthly
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		M36/7461 30-Oct-2018 10:05 am	M36/7462 30-Oct-2018 10:12 am	M36/7463 30-Oct-2018 10:18 am	M36/7464 30-Oct-2018 9:26 am	M36/7667 30-Oct-2018 10:33 am
Lab Number:		2072189.1	2072189.2	2072189.3	2072189.4	2072189.5
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Nitrate-N	g/m³	1.75	2.9	1.39	2.7	0.98
Nitrate-N + Nitrite-N	g/m³	1.75	2.9	1.39	2.7	0.99
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	2 #1	1 #1
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	1 #1	1 #1

Sample Name:		M36/7668 30-Oct-2018 10:25 am	M36/20415 30-Oct-2018 10:50 am	M36/20416 30-Oct-2018 10:40 am	BX23/0204 30-Oct-2018 9:55 am	BX23/0205 30-Oct-2018 9:45 am
Lab Number:		2072189.6	2072189.7	2072189.8	2072189.9	2072189.10
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	0.52	0.073
Nitrate-N	g/m³	0.43	3.1	2.5	4.7	6.5
Nitrate-N + Nitrite-N	g/m³	0.43	3.1	2.5	5.2	6.6
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	5 #1	31	3 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	5 #1	31	3 #1	< 1 #1	< 1 #1

Sample Name:		BX23/0207 30-Oct-2018 9:20 am	BX23/0208 30-Oct-2018 9:33 am	BX23/0206 30-Oct-2018 9:10 am		
Lab Number:		2072189.11	2072189.12	2072189.13		
Individual Tests						
Nitrite-N	g/m³	0.005	0.164	< 0.10	-	-
Nitrate-N	g/m³	4.0	0.004	9.2	-	-
Nitrate-N + Nitrite-N	g/m³	4.0	0.168	9.2	-	-
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	-	-
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #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

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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.	-	1-13
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m^3	1-12
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser, screen level. APHA 4500-NO3- I 22nd ed. 2012 (modified).	0.10 g/m^3	13
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m^3	1-13
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m^3	1-12
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser, screen level. APHA 4500-NO3- I 22nd ed. 2012 (modified).	0.10 g/m^3	13
Faecal Coliforms and E. coli profile			
Faecal Coliforms	Membrane Filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation Analysed at Hill Laboratories - Microbiology; 101c Waterloo Road, Hornby, Christchurch. APHA 9222 D, 22nd ed. 2012.	1 cfu / 100mL	1-13
Escherichia coli	Membrane filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation Analysed at Hill Laboratories - Microbiology; 101c Waterloo Road, Hornby, Christchurch. APHA 9222 G, 22nd ed. 2012.	1 cfu / 100mL	1-13

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Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2077726 SPv1
Contact:	Lisa Shaw	**Date Received:**	08-Nov-2018
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	14-Nov-2018
	PO Box 7469	**Quote No:**	42384
	Christchurch 8240	**Order No:**	
		Client Reference:	Burnham Rd Retic Nitrates
		Submitted By:	Lisa Shaw

Sample Type: Aqueous

Sample Name:		2976 - Burnham Rd 07-Nov-2018 6:20 pm				
Lab Number:		2077726.1				
Nitrite-N	g/m³	< 0.002	-	-	-	-
Nitrate-N	g/m³	2.6	-	-	-	-
Nitrate-N + Nitrite-N	g/m³	2.6	-	-	-	-

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
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m³	1
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m³	1

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Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2077767 SPv1
Contact:	Lisa Shaw	**Date Received:**	08-Nov-2018
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	14-Nov-2018
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	EWS - ERP - Nitrate Test
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		20460 - BX23/0206 08-Nov-2018 7:55 am				
Lab Number:		2077767.1				
Nitrite-N	g/m³	< 0.10	-	-	-	-
Nitrate-N	g/m³	8.1	-	-	-	-
Nitrate-N + Nitrite-N	g/m³	8.1	-	-	-	-

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
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser, screen level. APHA 4500-NO3- I 22nd ed. 2012 (modified).	0.10 g/m³	1
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser, screen level. APHA 4500-NO3- I 22nd ed. 2012 (modified).	0.10 g/m³	1

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Client Services Manager - Environmental

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Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2083352 SPv1
Contact:	Lisa Shaw	**Date Received:**	20-Nov-2018
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	23-Nov-2018
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	Pines Bores - Monthly
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		M36/7461 20-Nov-2018 10:05 am	M36/7462 20-Nov-2018 10:19 am	M36/7463 20-Nov-2018 10:39 am	M36/7464 20-Nov-2018 9:12 am	M36/7667 20-Nov-2018 10:54 am
Lab Number:		2083352.1	2083352.2	2083352.3	2083352.4	2083352.5
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	0.005	< 0.002	0.007
Nitrate-N	g/m³	1.21	3.1	1.50	2.9	2.9
Nitrate-N + Nitrite-N	g/m³	1.21	3.1	1.50	2.9	2.9
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	1 #1	< 1 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	1 #1	< 1 #1	< 1 #1	< 1 #1

Sample Name:		M36/7668 20-Nov-2018 10:47 am	M36/20415 20-Nov-2018 11:17 am	M36/20416 20-Nov-2018 11:07 am	BX23/0204 20-Nov-2018 9:54 am	BX23/0205 20-Nov-2018 9:43 am
Lab Number:		2083352.6	2083352.7	2083352.8	2083352.9	2083352.10
Individual Tests						
Nitrite-N	g/m³	< 0.002	0.004	0.003	0.063	0.030
Nitrate-N	g/m³	0.91	3.0	1.50	5.3	6.7
Nitrate-N + Nitrite-N	g/m³	0.91	3.1	1.50	5.4	6.7
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	32	210	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	28	200	< 1 #1	< 1 #1

Sample Name:		BX23/0207 20-Nov-2018 9:00 am	BX23/0208 20-Nov-2018 9:24 am	BX23/0206 20-Nov-2018 8:50 am		
Lab Number:		2083352.11	2083352.12	2083352.13		
Individual Tests						
Nitrite-N	g/m³	2.5	< 0.002	< 0.10	-	-
Nitrate-N	g/m³	0.40	< 0.002	8.0	-	-
Nitrate-N + Nitrite-N	g/m³	2.9	< 0.002	8.1	-	-
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	-	-
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #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

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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.	-	1-13
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m^3	1-12
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser, screen level. APHA 4500-NO3- I 22nd ed. 2012 (modified).	0.10 g/m^3	13
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m^3	1-13
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m^3	1-12
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser, screen level. APHA 4500-NO3- I 22nd ed. 2012 (modified).	0.10 g/m^3	13
Faecal Coliforms and E. coli profile			
Faecal Coliforms	Membrane Filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation Analysed at Hill Laboratories - Microbiology; 101c Waterloo Road, Hornby, Christchurch. APHA 9222 D, 22nd ed. 2012.	1 cfu / 100mL	1-13
Escherichia coli	Membrane filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation Analysed at Hill Laboratories - Microbiology; 101c Waterloo Road, Hornby, Christchurch. APHA 9222 G, 22nd ed. 2012.	1 cfu / 100mL	1-13

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Client Services Manager - Environmental

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Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2099313 SPv1
Contact:	Lisa Shaw	**Date Received:**	18-Dec-2018
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	20-Dec-2018
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	Pines Bores - Monthly
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		M36/7461 18-Dec-2018 10:05 am	M36/7462 18-Dec-2018 10:12 am	M36/7463 18-Dec-2018 10:17 am	M36/7464 18-Dec-2018 9:25 am	M36/7667 18-Dec-2018 10:27 am
Lab Number:		2099313.1	2099313.2	2099313.3	2099313.4	2099313.5
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	0.004	< 0.002	< 0.002
Nitrate-N	g/m³	2.5	2.7	1.81	5.2	4.5
Nitrate-N + Nitrite-N	g/m³	2.5	2.7	1.81	5.2	4.5
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	< 1 #1	< 1 #1

Sample Name:		M36/7668 18-Dec-2018 10:22 am	M36/20415 18-Dec-2018 10:45 am	M36/20416 18-Dec-2018 10:38 am	BX23/0204 18-Dec-2018 9:53 am	BX23/0205 18-Dec-2018 9:43 am
Lab Number:		2099313.6	2099313.7	2099313.8	2099313.9	2099313.10
Individual Tests						
Nitrite-N	g/m³	< 0.002	< 0.002	0.007	< 0.002	1.70
Nitrate-N	g/m³	0.58	3.2	0.183	5.5	5.0
Nitrate-N + Nitrite-N	g/m³	0.58	3.2	0.190	5.5	6.7
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	4 #1	1 #1	1 #1	< 1 #1
Escherichia coli	cfu / 100mL	< 1 #1	4 #1	1 #1	1 #1	< 1 #1

Sample Name:		BX23/0207 18-Dec-2018 9:18 am	BX23/0208 18-Dec-2018 9:30 am	BX23/0206 18-Dec-2018 9:10 am		
Lab Number:		2099313.11	2099313.12	2099313.13		
Individual Tests						
Nitrite-N	g/m³	0.071	0.003	< 0.10	-	-
Nitrate-N	g/m³	4.3	0.039	8.5	-	-
Nitrate-N + Nitrite-N	g/m³	4.4	0.042	8.5	-	-
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	< 1 #1	< 1 #1	< 1 #1	-	-
Escherichia coli	cfu / 100mL	< 1 #1	< 1 #1	< 1 #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

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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.	-	1-13
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	1-12
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	13
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1-13
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	1-12
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser, screen level. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.10 g/m³	13
Faecal Coliforms and E. coli profile			
Faecal Coliforms	Membrane Filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation Analysed at Hill Laboratories - Microbiology; 101c Waterloo Road, Hornby, Christchurch. APHA 9222 D 23rd ed. 2017.	1 cfu / 100mL	1-13
Escherichia coli	Membrane filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation Analysed at Hill Laboratories - Microbiology; 101c Waterloo Road, Hornby, Christchurch. APHA 9222 G 23rd ed. 2017.	1 cfu / 100mL	1-13

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Ara Heron BSc (Tech)
Client Services Manager - Environmental

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Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2103085 SPv1
Contact:	Lisa Shaw	**Date Received:**	28-Dec-2018
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	07-Jan-2019
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	EWS: Nitrates ERP BX23/0206
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		21278 - BX23/0206 28-Dec-2018 9:00 am				
Lab Number:		2103085.1				
Nitrite-N	g/m³	< 0.10	-	-	-	-
Nitrate-N	g/m³	8.4	-	-	-	-
Nitrate-N + Nitrite-N	g/m³	8.4	-	-	-	-

Summary of Methods

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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
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
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser, screen level. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.10 g/m³	1

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Kim Harrison MSc
Client Services Manager - Environmental

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Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2103582 SPv1
Contact:	Lisa Shaw	**Date Received:**	03-Jan-2019
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	08-Jan-2019
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	EWS: ERP Nitrates BX23/0206
		Submitted By:	Liane Burtt

Sample Type: Aqueous

Sample Name:		21319 - BX23/0206 02-Jan-2019 10:48 am				
Lab Number:		2103582.1				
Nitrite-N	g/m³	< 0.10	-	-	-	-
Nitrate-N	g/m³	8.3	-	-	-	-
Nitrate-N + Nitrite-N	g/m³	8.3	-	-	-	-

Summary of Methods

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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
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
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser, screen level. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.10 g/m³	1

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Ara Heron BSc (Tech)
Client Services Manager - Environmental

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Certificate of Analysis

Client:	Selwyn District Council	**Lab No:**	2120197 SPv1
Contact:	Lisa Shaw	**Date Received:**	07-Feb-2019
	C/- Food and Health Standards (2006) Limited	**Date Reported:**	11-Feb-2019
	PO Box 7469	**Quote No:**	45606
	Christchurch 8240	**Order No:**	
		Client Reference:	EWS ERP Pines Bores Extra Nitrate Test-BX23/0206
		Submitted By:	Catherine McGoldrick

Sample Type: Aqueous

Sample Name:		6062 - BX23/0206 06-Feb-2019 11:58 am				
Lab Number:		2120197.1				
Nitrite-N	g/m³	< 0.10	-	-	-	-
Nitrate-N	g/m³	9.4	-	-	-	-
Nitrate-N + Nitrite-N	g/m³	9.5	-	-	-	-

Summary of Methods

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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
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
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser, screen level. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.10 g/m³	1

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Client Services Manager - Environmental

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Certificate of Analysis

Client:	Aqualinc Research Limited	**Lab No:**	2205663 SPv1
Contact:	N Borrie	**Date Received:**	09-Jul-2019
	C/- Aqualinc Research Limited	**Date Reported:**	16-Jul-2019
	PO Box 20462	**Quote No:**	31833
	Bishopdale	**Order No:**	
	Christchurch 8543	**Client Reference:**	
		Submitted By:	Daniel Farrow

Sample Type: Soil

Sample Name:		CP1 09-Jul-2019 10:00 am	CP2 09-Jul-2019 10:00 am	CP3 09-Jul-2019 10:00 am	CP4 09-Jul-2019 10:00 am	CP5 09-Jul-2019 10:00 am
Lab Number:		2205663.1	2205663.2	2205663.3	2205663.4	2205663.5
Total Recoverable Arsenic	mg/kg dry wt	2.8	2.8	2.7	2.8	2.7
Total Recoverable Cadmium	mg/kg dry wt	0.046	0.054	0.023	0.027	0.034
Total Recoverable Chromium	mg/kg dry wt	11.0	11.1	10.1	10.5	9.7
Total Recoverable Copper	mg/kg dry wt	3.5	3.7	3.6	3.7	3.9
Total Recoverable Lead	mg/kg dry wt	11.5	21	10.6	11.4	19.4
Total Recoverable Mercury	mg/kg dry wt	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Total Recoverable Nickel	mg/kg dry wt	6.8	6.4	5.9	6.2	6.3
Total Recoverable Phosphorus	mg/kg dry wt	550	640	510	610	440
Total Recoverable Zinc	mg/kg dry wt	49	49	44	45	45
Total Nitrogen*	g/100g dry wt	0.27	0.29	0.22	0.24	0.21

Sample Name:		CP6 09-Jul-2019 10:00 am	CP7 09-Jul-2019 10:00 am			
Lab Number:		2205663.6	2205663.7			
Total Recoverable Arsenic	mg/kg dry wt	2.8	2.9	-	-	-
Total Recoverable Cadmium	mg/kg dry wt	0.028	0.034	-	-	-
Total Recoverable Chromium	mg/kg dry wt	10.8	10.9	-	-	-
Total Recoverable Copper	mg/kg dry wt	3.8	4.2	-	-	-
Total Recoverable Lead	mg/kg dry wt	12.9	12.6	-	-	-
Total Recoverable Mercury	mg/kg dry wt	0.02	< 0.02	-	-	-
Total Recoverable Nickel	mg/kg dry wt	6.6	7.1	-	-	-
Total Recoverable Phosphorus	mg/kg dry wt	460	490	-	-	-
Total Recoverable Zinc	mg/kg dry wt	45	44	-	-	-
Total Nitrogen*	g/100g dry wt	0.22	0.24	-	-	-

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: Soil

Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-7
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-7
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1-7
Total Recoverable Arsenic	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, trace level. US EPA 200.2.	0.2 mg/kg dry wt	1-7

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Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Total Recoverable Cadmium	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, trace level. US EPA 200.2.	0.010 mg/kg dry wt	1-7
Total Recoverable Chromium	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, trace level. US EPA 200.2.	0.2 mg/kg dry wt	1-7
Total Recoverable Copper	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, trace level. US EPA 200.2.	0.2 mg/kg dry wt	1-7
Total Recoverable Lead	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, trace level. US EPA 200.2.	0.04 mg/kg dry wt	1-7
Total Recoverable Mercury	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, trace level. US EPA 200.2.	0.02 mg/kg dry wt	1-7
Total Recoverable Nickel	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, trace level. US EPA 200.2.	0.2 mg/kg dry wt	1-7
Total Recoverable Phosphorus	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	40 mg/kg dry wt	1-7
Total Recoverable Zinc	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, trace level. US EPA 200.2.	0.4 mg/kg dry wt	1-7
Total Nitrogen*	Catalytic Combustion (900°C, O2), separation, Thermal Conductivity Detector [Elementar Analyser].	0.05 g/100g dry wt	1-7

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Graham Corban MSc Tech (Hons)
Client Services Manager - Environmental

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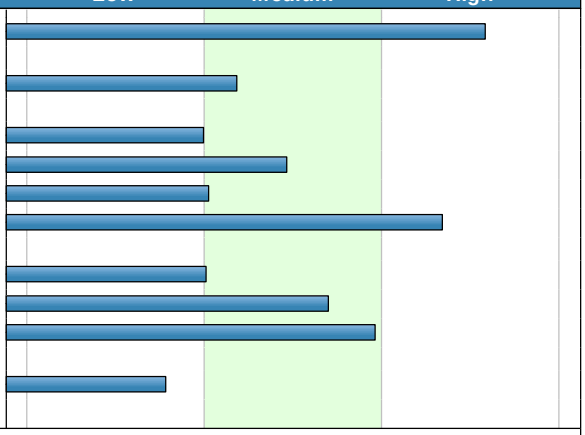
Certificate of Analysis

Client:	Aqualinc Research Limited	**Lab No:**	2206034 shvpv1
Address:	PO Box 20462 Bishopdale Christchurch 8543	**Date Received:**	10-Jul-2019
		Date Reported:	16-Jul-2019
		Quote No:	31833
		Order No:	
		Client Reference:	
Phone:	03 964 6521	**Submitted By:**	Daniel Farrow

Sample Name: CP1 **Lab Number:** 2206034.1
Sample Type: SOIL Mixed Pasture (S1)

Analysis		Level Found	Medium Range
pH	pH Units	6.8	5.8 - 6.2
Olsen Phosphorus	mg/L	22	20 - 30
Potassium	me/100g	0.40	0.40 - 0.60
Calcium	me/100g	6.8	4.0 - 10.0
Magnesium	me/100g	1.01	1.00 - 1.60
Sodium	me/100g	0.84	0.20 - 0.50
CEC	me/100g	12	12 - 25
Total Base Saturation	%	75	50 - 85
Volume Weight	g/mL	0.99	0.60 - 1.00
Organic Matter*	%	5.5	7.0 - 17.0
Total Carbon*	%	3.2	



Base Saturation %	K 3.3	Ca 56	Mg 8.4	Na 7.0
MAF Units	K 8	Ca 8	Mg 23	Na 38

The above nutrient graph compares the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.

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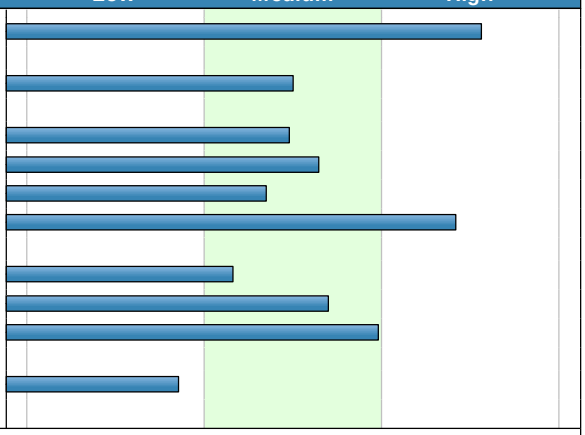
Certificate of Analysis

Client:	Aqualinc Research Limited	**Lab No:**	2206034 shvpv1
Address:	PO Box 20462 Bishopdale Christchurch 8543	**Date Received:**	10-Jul-2019
		Date Reported:	16-Jul-2019
		Quote No:	31833
		Order No:	
		Client Reference:	
Phone:	03 964 6521	**Submitted By:**	Daniel Farrow

Sample Name: CP2 **Lab Number:** 2206034.2
Sample Type: SOIL Mixed Pasture (S1)

Analysis		Level Found	Medium Range
pH	pH Units	6.8	5.8 - 6.2
Olsen Phosphorus	mg/L	25	20 - 30
Potassium	me/100g	0.50	0.40 - 0.60
Calcium	me/100g	7.9	4.0 - 10.0
Magnesium	me/100g	1.21	1.00 - 1.60
Sodium	me/100g	0.92	0.20 - 0.50
CEC	me/100g	14	12 - 25
Total Base Saturation	%	75	50 - 85
Volume Weight	g/mL	0.99	0.60 - 1.00
Organic Matter*	%	6.0	7.0 - 17.0
Total Carbon*	%	3.5	



Base Saturation %	K 3.5	Ca 56	Mg 8.6	Na 6.5
MAF Units	K 10	Ca 10	Mg 27	Na 42

The above nutrient graph compares the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.

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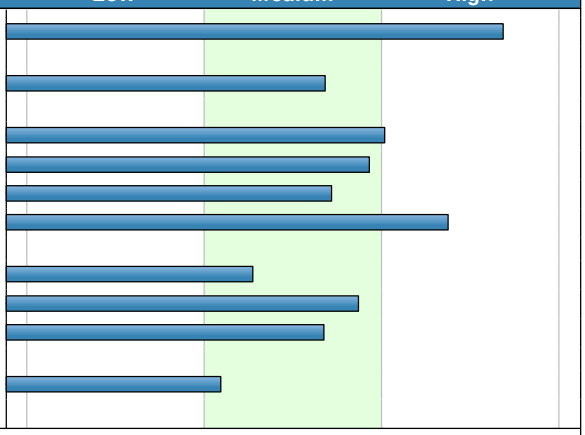
Certificate of Analysis

Client:	Aqualinc Research Limited	**Lab No:**	2206034 shvpv1
Address:	PO Box 20462 Bishopdale Christchurch 8543	**Date Received:**	10-Jul-2019
		Date Reported:	16-Jul-2019
		Quote No:	31833
		Order No:	
		Client Reference:	
Phone:	03 964 6521	**Submitted By:**	Daniel Farrow

Sample Name: CP3 **Lab Number:** 2206034.3
Sample Type: SOIL Mixed Pasture (S1)

Analysis		Level Found	Medium Range
pH	pH Units	6.9	5.8 - 6.2
Olsen Phosphorus	mg/L	27	20 - 30
Potassium	me/100g	0.61	0.40 - 0.60
Calcium	me/100g	9.6	4.0 - 10.0
Magnesium	me/100g	1.43	1.00 - 1.60
Sodium	me/100g	0.88	0.20 - 0.50
CEC	me/100g	16	12 - 25
Total Base Saturation	%	80	50 - 85
Volume Weight	g/mL	0.87	0.60 - 1.00
Organic Matter*	%	8.0	7.0 - 17.0
Total Carbon*	%	4.6	



Base Saturation %	K 3.9	Ca 62	Mg 9.2	Na 5.7
MAF Units	K 11	Ca 10	Mg 28	Na 35

The above nutrient graph compares the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.

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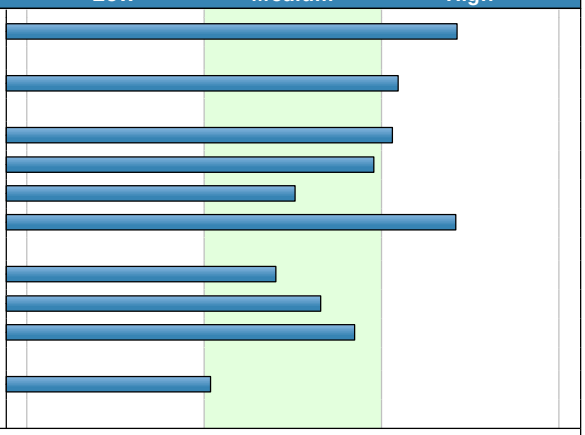
W www.hill-laboratories.com

Certificate of Analysis

Client:	Aqualinc Research Limited	**Lab No:**	2206034 shvpv1
Address:	PO Box 20462 Bishopdale Christchurch 8543	**Date Received:**	10-Jul-2019
		Date Reported:	16-Jul-2019
		Quote No:	31833
		Order No:	
		Client Reference:	
Phone:	03 964 6521	**Submitted By:**	Daniel Farrow

Sample Name: CP4 **Lab Number:** 2206034.4
Sample Type: SOIL Mixed Pasture (S1)

Analysis		Level Found	Medium Range
pH	pH Units	6.6	5.8 - 6.2
Olsen Phosphorus	mg/L	36	20 - 30
Potassium	me/100g	0.64	0.40 - 0.60
Calcium	me/100g	9.7	4.0 - 10.0
Magnesium	me/100g	1.31	1.00 - 1.60
Sodium	me/100g	0.92	0.20 - 0.50
CEC	me/100g	17	12 - 25
Total Base Saturation	%	73	50 - 85
Volume Weight	g/mL	0.94	0.60 - 1.00
Organic Matter*	%	7.4	7.0 - 17.0
Total Carbon*	%	4.3	



Base Saturation %	K 3.7	Ca 56	Mg 7.6	Na 5.3
MAF Units	K 12	Ca 11	Mg 28	Na 40

The above nutrient graph compares the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.

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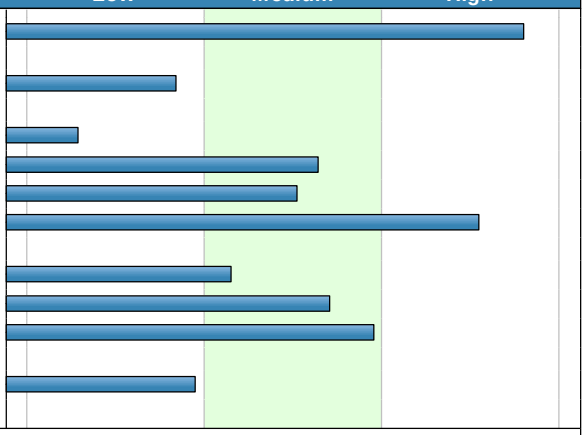
		Date Reported:	16-Jul-2019
		Quote No:	31833
		Order No:	
		Client Reference:	
Phone:	03 964 6521	**Submitted By:**	Daniel Farrow

Sample Name: CP5 **Lab Number:** 2206034.5
Sample Type: SOIL Mixed Pasture (S1)

Analysis		Level Found	Medium Range
pH	pH Units	7.0	5.8 - 6.2
Olsen Phosphorus	mg/L	18	20 - 30
Potassium	me/100g	0.22	0.40 - 0.60
Calcium	me/100g	7.9	4.0 - 10.0
Magnesium	me/100g	1.31	1.00 - 1.60
Sodium	me/100g	1.05	0.20 - 0.50
CEC	me/100g	14	12 - 25
Total Base Saturation	%	75	50 - 85
Volume Weight	g/mL	0.98	0.60 - 1.00
Organic Matter*	%	6.6	7.0 - 17.0
Total Carbon*	%	3.9	



Base Saturation %	K 1.6	Ca 56	Mg 9.4	Na 7.5
MAF Units	K 4	Ca 10	Mg 29	Na 48

The above nutrient graph compares the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.

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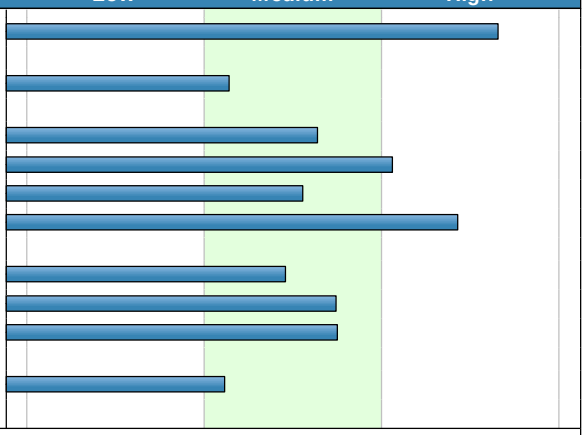
Address:	PO Box 20462 Bishopdale Christchurch 8543	**Date Received:**	10-Jul-2019
		Date Reported:	16-Jul-2019
		Quote No:	31833
		Order No:	
		Client Reference:	
Phone:	03 964 6521	**Submitted By:**	Daniel Farrow

Sample Name: CP6 **Lab Number:** 2206034.6
Sample Type: SOIL Mixed Pasture (S1)

Analysis		Level Found	Medium Range
pH	pH Units	6.9	5.8 - 6.2
Olsen Phosphorus	mg/L	21	20 - 30
Potassium	me/100g	0.53	0.40 - 0.60
Calcium	me/100g	10.9	4.0 - 10.0
Magnesium	me/100g	1.33	1.00 - 1.60
Sodium	me/100g	0.93	0.20 - 0.50
CEC	me/100g	18	12 - 25
Total Base Saturation	%	76	50 - 85
Volume Weight	g/mL	0.90	0.60 - 1.00
Organic Matter*	%	8.1	7.0 - 17.0
Total Carbon*	%	4.7	



Base Saturation %	K 2.9	Ca 60	Mg 7.4	Na 5.2
MAF Units	K 10	Ca 12	Mg 27	Na 39

The above nutrient graph compares the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.

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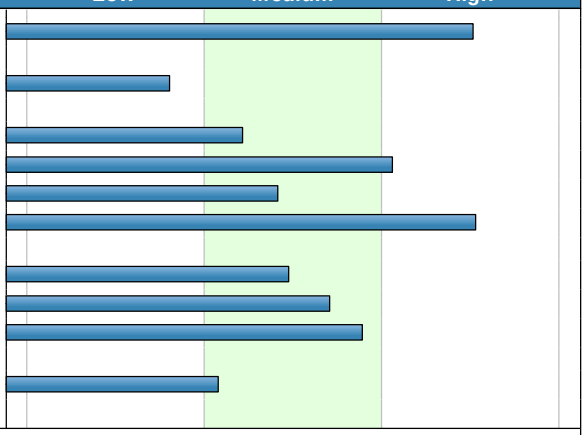
		Date Reported:	16-Jul-2019
		Quote No:	31833
		Order No:	
		Client Reference:	
Phone:	03 964 6521	**Submitted By:**	Daniel Farrow

Sample Name: CP7 **Lab Number:** 2206034.7
Sample Type: SOIL Mixed Pasture (S1)

Analysis		Level Found	Medium Range
pH	pH Units	6.7	5.8 - 6.2
Olsen Phosphorus	mg/L	17	20 - 30
Potassium	me/100g	0.44	0.40 - 0.60
Calcium	me/100g	10.9	4.0 - 10.0
Magnesium	me/100g	1.25	1.00 - 1.60
Sodium	me/100g	1.03	0.20 - 0.50
CEC	me/100g	18	12 - 25
Total Base Saturation	%	75	50 - 85
Volume Weight	g/mL	0.96	0.60 - 1.00
Organic Matter*	%	7.8	7.0 - 17.0
Total Carbon*	%	4.5	



Base Saturation %	K 2.4	Ca 60	Mg 6.9	Na 5.7
MAF Units	K 9	Ca 13	Mg 27	Na 45

The above nutrient graph compares the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.

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		Quote No:	31833
		Order No:	
		Client Reference:	
Phone:	03 964 6521	**Submitted By:**	Daniel Farrow

Soil Analysis Results

	Sample Name:	CP1	CP2	CP3	CP4	CP5	CP6
	Lab Number:	2206034.1	2206034.2	2206034.3	2206034.4	2206034.5	2206034.6
	Sample Type:	SOIL Mixed Pasture	SOIL Mixed Pasture	SOIL Mixed Pasture	SOIL Mixed Pasture	SOIL Mixed Pasture	SOIL Mixed Pasture
	Sample Type Code:	S1	S1	S1	S1	S1	S1
pH	pH Units	6.8	6.8	6.9	6.6	7.0	6.9
Olsen Phosphorus	mg/L	22	25	27	36	18	21
Potassium	me/100g	0.40	0.50	0.61	0.64	0.22	0.53
Potassium	%BS	3.3	3.5	3.9	3.7	1.6	2.9
Potassium	MAF units	8	10	11	12	4	10
Calcium	me/100g	6.8	7.9	9.6	9.7	7.9	10.9
Calcium	%BS	56	56	62	56	56	60
Calcium	MAF units	8	10	10	11	10	12
Magnesium	me/100g	1.01	1.21	1.43	1.31	1.31	1.33
Magnesium	%BS	8.4	8.6	9.2	7.6	9.4	7.4
Magnesium	MAF units	23	27	28	28	29	27
Sodium	me/100g	0.84	0.92	0.88	0.92	1.05	0.93
Sodium	%BS	7.0	6.5	5.7	5.3	7.5	5.2
Sodium	MAF units	38	42	35	40	48	39
CEC	me/100g	12	14	16	17	14	18
Total Base Saturation	%	75	75	80	73	75	76
Volume Weight	g/mL	0.99	0.99	0.87	0.94	0.98	0.90
Organic Matter*	%	5.5	6.0	8.0	7.4	6.6	8.1
Total Carbon*	%	3.2	3.5	4.6	4.3	3.9	4.7

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		Order No:	
		Client Reference:	
Phone:	03 964 6521	**Submitted By:**	Daniel Farrow

Soil Analysis Results

Sample Name:		CP7					
Lab Number:		2206034.7					
Sample Type:		SOIL Mixed Pasture					
Sample Type Code:		S1					
pH	pH Units	6.7	-	-	-	-	-
Olsen Phosphorus	mg/L	17	-	-	-	-	-
Potassium	me/100g	0.44	-	-	-	-	-
Potassium	%BS	2.4	-	-	-	-	-
Potassium	MAF units	9	-	-	-	-	-
Calcium	me/100g	10.9	-	-	-	-	-
Calcium	%BS	60	-	-	-	-	-
Calcium	MAF units	13	-	-	-	-	-
Magnesium	me/100g	1.25	-	-	-	-	-
Magnesium	%BS	6.9	-	-	-	-	-
Magnesium	MAF units	27	-	-	-	-	-
Sodium	me/100g	1.03	-	-	-	-	-
Sodium	%BS	5.7	-	-	-	-	-
Sodium	MAF units	45	-	-	-	-	-
CEC	me/100g	18	-	-	-	-	-
Total Base Saturation	%	75	-	-	-	-	-
Volume Weight	g/mL	0.96	-	-	-	-	-
Organic Matter*	%	7.8	-	-	-	-	-
Total Carbon*	%	4.5	-	-	-	-	-

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		Client Reference:	
Phone:	03 964 6521	**Submitted By:**	Daniel Farrow

Analyst's Comments

Samples 1-7 Comment:
The medium or optimum range guidelines shown in the histogram report relate to sampling protocols as per Hill Laboratories' crop guides and are based on reference values where these are published. Results for samples collected to different depths than those described in the crop guide should be interpreted with caution.
For pastoral soils, the medium ranges are specific for a 75mm sample depth, but if a 150mm sampling depth is used the nutrient levels measured may appear low against these ranges, as nutrients are typically more concentrated in the top of the soil profile. These soil profile differences are altered upon cultivation or contouring.

Samples 1-7 Comment:
While soil Mg MAF levels of 8-10 (0.4 - 0.6 me/100g) are sufficient for pasture production, soil levels of 25-30 (1 - 1.6 me/100g) are required to ensure adequate Mg content in pasture for animal health (greater than 0.22% in the herbage).

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: Soil

Test	Method Description	Default Detection Limit	Sample No
Sample Registration*	Samples were registered according to instructions received.	-	1-7
Soil Prep (Dry & Grind)*	Air dried at 35 - 40°C overnight (residual moisture typically 4%) and crushed to pass through a 2mm screen.	-	1-7
pH	1:2 (v/v) soil:water slurry followed by potentiometric determination of pH.	0.1 pH Units	1-7
Olsen Phosphorus	Olsen extraction followed by Molybdenum Blue colorimetry.	1 mg/L	1-7
Organic Matter*	Organic Matter is 1.72 x Total Carbon.	0.2 %	1-7
Total Carbon*	Determined by NIR, calibration based on Total Carbon by Dumas combustion.	0.1 %	1-7
Potassium	1M Neutral ammonium acetate extraction followed by ICP-OES.	0.01 me/100g	1-7
Calcium	1M Neutral ammonium acetate extraction followed by ICP-OES.	0.5 me/100g	1-7
Magnesium	1M Neutral ammonium acetate extraction followed by ICP-OES.	0.04 me/100g	1-7
Sodium	1M Neutral ammonium acetate extraction followed by ICP-OES.	0.05 me/100g	1-7
CEC	Summation of extractable cations (K, Ca, Mg, Na) and extractable acidity. May be overestimated if soil contains high levels of soluble salts or carbonates.	2 me/100g	1-7
Total Base Saturation	Calculated from Extractable Cations and Cation Exchange Capacity.	5 %	1-7
Volume Weight	The weight/volume ratio of dried, ground soil.	0.01 g/mL	1-7

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

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

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.

Karen Lim BSc
Client Services Manager - Agriculture

AQUALINC

AQUALINC RESEARCH LIMITED

Our Ref: L05191-04

29 July 2019

Selwyn District Council
PO Box 90
ROLLESTON 7643

Attention: Amit Chauhan

Dear Amit

ROLLESTON PINES SEWAGE EFFLUENT IRRIGATION SITE
– SOIL SAMPLING RESULTS, JULY 2019

Soil samples from the Rolleston Pines sewage effluent irrigation site were collected from blocks CP1, CP2, CP3, CP4, CP5, CP6 and CP7 on 9th July 2019. These soil samples have been analysed for various parameters as detailed in condition 26 of resource consent CRC153952 and condition 37 of resource consent CRC131423 to discharge treated sewage effluent onto land.

The results of these analyses are contained in the two attached reports from Hill Laboratories.

If you have any queries about this data, please contact me.

Yours sincerely

Neal Borrie

Neal Borrie
Senior Environmental Engineer

Encl

www.aqualinc.com

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HAMILTON PO Box 14-041, Enderley, Hamilton 3252 Phone: (07) 858 4851

ASHBURTON PO Box 557, Ashburton 7740 Phone: (03) 307 6680 Fax: (03) 307 1581

Annual Compliance Report for

Resource Consent CRC153952 – The Pines WWTP

Selwyn District Council

Compliance Report for –

CRC153952 - Discharge of Contaminants to Land for the Period 1 July 2018 – 30 June 2019

REPORT

6 August 2019

Document Control

Responsibilities	**Person(s)**	**Designation**
Author	Victor Mthamo	Consultant (Reeftide Environmental & Projects Ltd)
Reviewers	Amit Chauhan	SDC - Water and Wastewater Engineering Unit
Approved for Issue	Amit Chauhan	SDC - Water and Wastewater Engineering
Date	**6 August 2019**	

Table of Contents

Tables

Figures

Appendices

Preface

This report has been prepared to meet the requirements of Condition 30 of Consent CRC153952 which states that:

The consent holder shall provide the Canterbury Regional Council with an Annual Monitoring Report each year commencing 12 months from the date of the exercise of this consent. The Annual Monitoring Report shall include, but not be limited to:

a. *Monthly monitoring records.*
b. *All sampling results required under the conditions of consent.*
c. *Annual average nitrogen loading rate.*
d. *A record of any complaints from members of the public and actions taken.*
e. *Status of compliance with consent conditions.*
f. *Reasons for any non-compliances and actions taken or planned to prevent reoccurrences.*

This report shall then becomes the formal record of results for that year.

This annual report covers the period 1 July 2018 to 30 June 2019. The report provides the information required, details of the analyses carried out to provide the information required and draws conclusions on the compliance with the resource consent conditions. It also discusses remedial measures necessary to address any observed non-compliances. In summary:

- The nitrates in the bore samples for Bore BX23/0206 the sampling done on 28/8/2018, 5/9/2018, 30/10/2018 and 18/12/2018 were elevated.

While the above monitoring bore showed elevated levels of nitrates SDC's conclusion is that the consent conditions where complied with during the period under review. This because:

1. All the four downstream monitoring bores BX23/0206, BX23/0207, M36/7464 and BX23/0208 complied with the condition 25d (ii).

2. The elevated levels are not due to the discharges from Pines treatment plant. SDC demonstrated this in its correspondences to the RMO during previous years of monitoring.

3. Furthermore, the new upstream bore BX23/0878 in stalled in 2019 on advice from ECan reported high nitrate levels. The high nitrate levels in the upstream bore supports the Council's understanding that the high nitrate levels are a result of some other activities upstream of the Pines discharge areas.

SDC also collected a couple of samples taken from the operations monitoring bores M36/7462 and M36/20416 and these returned higher levels of total faecal coliforms. It was likely that the elevated levels of faecal coliforms were as a result of piggery farming activities carried by the private leasee and not from the plant. The sampling team was provided with information on hygiene practices to follow during sampling.

Condition 9 requires that the 95th percentile for the faecal coliforms be less than 1,000 cfu/100 ML. The assessment of the data shows that the 95th percentile was 2,259 cfu/100 ML based on the average monthly data and 4,250 cfu/100 ML based on the analysis of the individual sampling data. The commissioning of the new bioreactor and the UV system will ensure on-going compliance with Condition 9.

1 Introduction

1.1 Background and Purpose

Selwyn District Council (SDC) owns and operates the Pines Wastewater Treatment Plant (WWTP). The WWTP is located at 271 Burnham School Road (Lot 1 DP 309881) on land owned by the Selwyn District Council. Figure 1.1 shows the location of the WWTP.

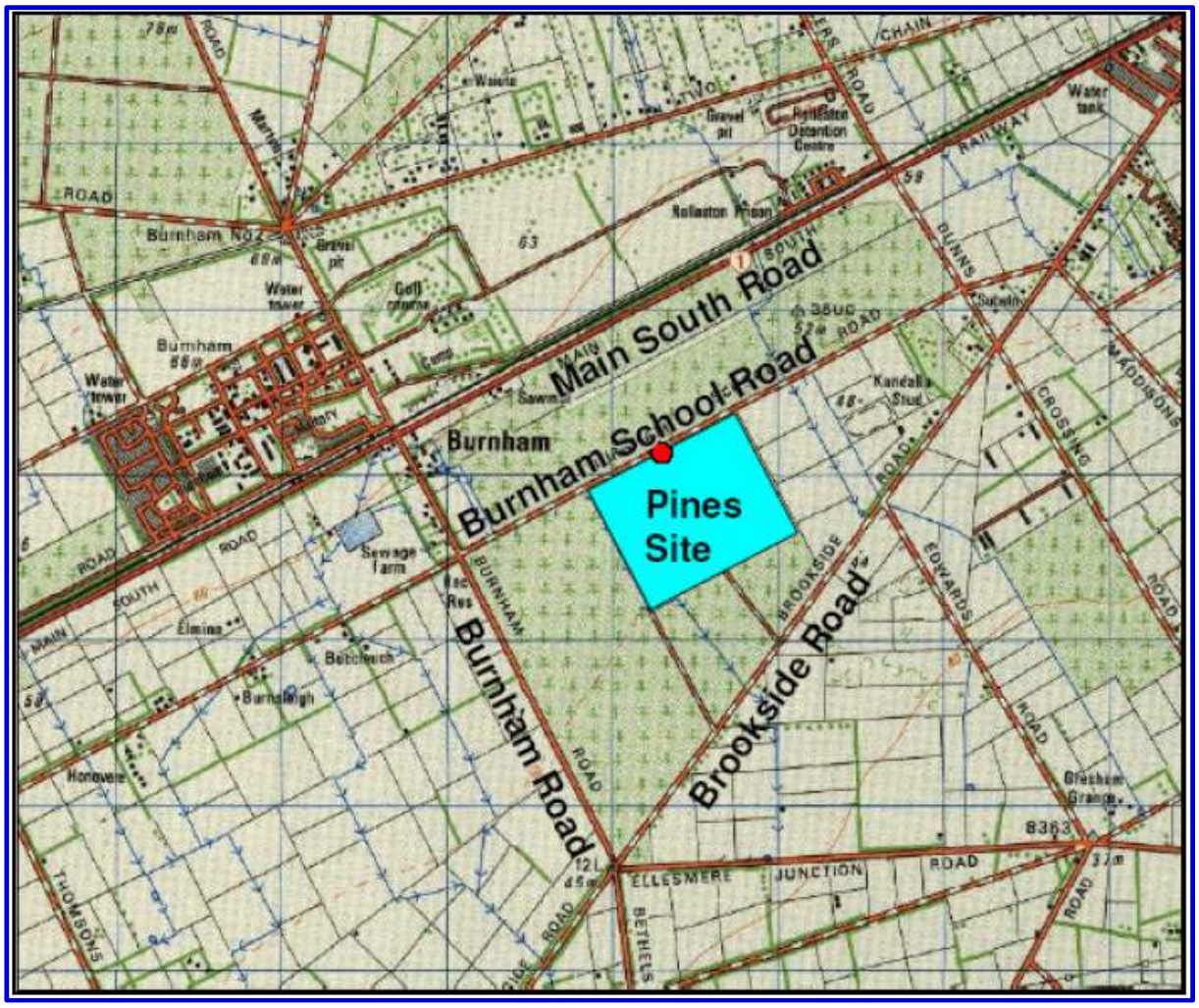

Figure 1.1 – Location of The Pines WWTP

The Pines WWTP incorporates screening, biological activated sludge treatment with nitrogen removal, clarification and UV disinfection before irrigation to land. The activated sludge system is super aerated before it goes through a four-stage Bardenpho process consisting of sequential anoxic and aerobic zones to remove BOD, Suspended Solids (SS) and nitrogen removal via advanced nitrification and denitrification. Within the aerobic zones the ammonia in the wastewater is converted to nitrate (nitrification), which is recycled back through the anoxic zones where the nitrate is converted to nitrogen gas in the absence of oxygen and released to the atmosphere (denitrification). The clarifier separates activated sludge solids from the treated wastewater and the UV disinfection system provides a reduction in bacteria and pathogens. Figure 1.2 is a flow diagram of the treatment process.

The WWTP was commissioned in May 2007 and was built to cope with an initial Average Dry Weather Flow (ADWF) of 1,500 m^3/day, a Maximum Daily Flow (MDF) of 2,100 m^3/day and a

Peak Dry Weather Flow (PDWF) of 49 L/s. The current and future capacities of The Pines are summarised in Table 1.1. Pines III was completed in 2018. This increased the plant capacity to 45,000 PE from current 30,000 PE. Stage IV will be completed as the design population approaches 60,000 people and an average dry weather flow of 14,580 m^3/day.

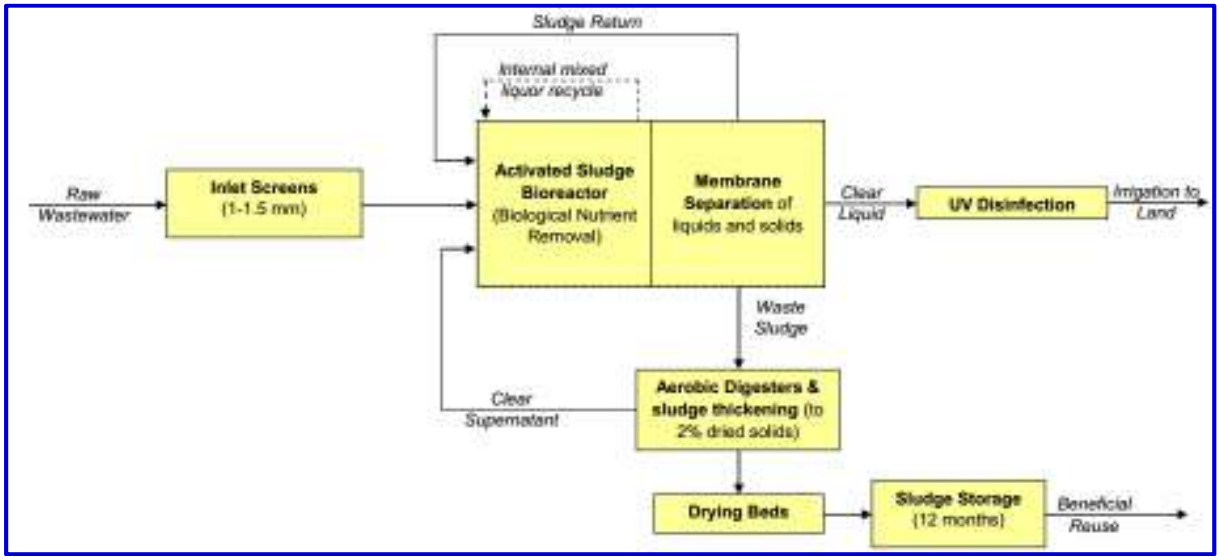

Figure 1.2 – Basic Flow Diagram of The Pines Treatment Plant

Table 1.1 – Design Flows and Loads for The Pines

Parameter	Unit	Phase II	Phase III	Phase IV
Design Population	PE	30,000	45,000	60,000
ADWF	m^3/day	7,150	10,830	14,580
PDWF	L/s	175	265	355
MDF	m^3/day	17,160	25,990	34,990
Loads:				
COD	Kg/day	3,940	5,100	7,796
BOD	Kg/day	1,970	2,550	3,898
TSS	Kg/day	2,120	2,750	4,204
TKN	Kg/day	390	510	780

Discharge to land is over Area A, Area B and Area C shown in Figure 1.3. The treated wastewater is applied to land using centre pivot irrigators. There are seven centre pivots that are operated, and these vary in size from 12.19–50.00 ha as summarised in Table 1.2 below.

Table 1.2 – Irrigation Centre Pivots

Centre Pivot	Area (ha) – Jul 2018 – Oct 2018	Area (ha) from Nov 2018
CP1	12.19	12.19
CP2	12.19	12.19
CP3	12.57	12.57
CP4	12.57	12.57
CP5	15.62	45.6**
CP6	15.62	45.6**
CP7	50.00*	50.00*
Total	**130.76**	**190.72**

**50 ha is the full circle area. During most of the past year the irrigator has been operating on a partial circle of approximately 300 degrees.*
Pivots 5 and 6 were extended by adding more spans increasing the irrigated areas from 15.62 ha each to 45.6 ha each. The extensions were commissioned in November 2018.

1.2 Reasons for this Annual Report

This report has been prepared to meet the requirements of Condition 30 of Consent CRC153952 (**Appendix A**) which states that:

The consent holder shall provide the Canterbury Regional Council with an Annual Monitoring Report each year commencing 12 months from the date of the exercise of this consent. The Annual Monitoring Report shall include, but not be limited to:

a. *Monthly monitoring records.*
b. *All sampling results required under the conditions of consent.*
c. *Annual average nitrogen loading rate.*
d. *A record of any complaints from members of the public and actions taken.*
e. *Status of compliance with consent conditions.*
f. *Reasons for any non-compliances and actions taken or planned to prevent reoccurrences.*

Figure 1.3 – Consented Irrigation Areas

1.3 Structure of the Report

Section 1: Which is this section, it provides some background on the treatment system, discharge areas, consent conditions and the reporting requirements.

Section 2: Identifies the consent conditions that need to be reported on in this annual report.

Section 3: Provides the compliance data required in the consent and also determines whether the conditions in Section 2 are complied with or not.

Section 4: Describes the proposed action plans to deal with any identified non-compliances.

Section 5: Conclusions.

2 Conditions of CRC153952 Relevant To The Annual Compliance Report

2.1 Conditions to be addressed by the Annual Report

The consent has 43 conditions (**Appendix A**). Not all the 43 conditions require on-going monitoring and reporting and the ones that do are summarised in Table 2.1.

Table 2.1 – Summary of the Key Conditions to be Monitored/Reported On

Condition	Summary of the Condition
1	Defines the source of the discharges and the nature of the discharges.
2	Defines the location of the discharge areas and the maximum discharge volumes.
3	Influent volumes to be < the capacity of the treatment plant and the discharge area.
4	Requires the discharge to be UV treated prior to discharge and limits the faecal coliforms to 500 cfus/100ml. Confirmation that the UV system is calibrated annually.
6	The discharge method shall be spray irrigation only.
7	Limits the depth of application of treated effluent to 64 mm per 5 consecutive days and that no single application of treated wastewater shall exceed 20 mm.
8	Limits the monthly average hydraulic loading rate to < 8 mm/day.
9	Gives the BOD, SS, TN and E. Coli limits. The condition also stipulates the frequency (at least monthly) and the sampling point.
10	Requires confirmation that no ponding occurs 48 hours after irrigation.
11	Requires confirmation that the discharge does not occur within 20 m of surface waterways
13	States the setback distances from other property boundaries with and without shelterbelts.
14	Prohibits spray of aerosols beyond the property boundary and requires confirmation that shelterbelt screening requirements have been met, the discharge does not pond and the minimum setback distances are complied with.
17	Compliance with aerosols and odour discharge requirements.
18	Cut and carry guidelines from the discharge area.
21	Monthly sampling of BOD, TSS, TKN, Ammoniacal-N and FCs from the pump chamber.
22	Confirmation that daily records of volumes of wastewater applied to land, irrigation zones irrigated and depth of application of wastewater were kept.
23	Confirmation that the monthly records were kept during the reporting period.
25	Defines the monitoring of bores located up-gradient and down-gradient of the discharge area, monthly sampling of the bores for nitrates, nitrogen and FCs and the accompanying contaminant limits.
26	Specifies the monitoring of the effects of the discharge on soils, the sampling regime required and determinands to be sampled and reported on.
27	Provides the limits for the determinands sampled in Condition 26.
28	Specifies the qualifications for the sampling personnel and the analysing laboratory.
30	Requirement for an Annual Monitoring Report.
36	Confirmation that (i) the discharge was in an aerobic state,(ii) DO > 0.5 g/m^3, (iii) continuous monitoring of DO and (iv) the DO equipment was calibrated and serviced.
39	Sets out the contingency measures to be employed if the DO in Condition 36(b) are not met or when FCs > 500 cfu/100 ml
40	Provides contingency measures to be employed when Condition 39(b) is not met.
41	Confirmation that there were no end guns on the centre pivots.
42	Confirmation that after irrigation has ceased for more than 24 hours the system was not started within 200 m of the plan change area.
43	Defines the set-up and operation of the irrigation system on land adjacent to the Plan Change 8 area.

The conditions not included in Table 2.1 do not require on-going monitoring or they were complied with through the design process.

3 Discharge Consent Management

3.1 General

The focus of this Annual Report is to report on the monitoring of the conditions listed in Table 2.1 above. The following sections discuss these conditions, the monitoring carried out and the extent to which the conditions were or were not complied with.

3.2 Conditions 1 and 2(a)-(b) – Nature of the Discharges to the LTA, Source of Wastewater and the LTA Boundary

Condition 1 states that "*The discharge shall be only:*

a. *Treated wastewater originating from the Pines Wastewater Treatment Facility located at Lot 1 DP 309881, Burnham School Road, Burnham as shown on Plan CRC153952A; and*
b. *Odour and aerosols associated with the spray irrigation of treated wastewater.*

Condition 2 states that "*The discharge shall only occur within Wastewater Discharge Area A, B and C shown on Plan CRC153952B, and bound by Topo50 map references:*

a. *BX23 459 672, BX23 472 699, BX23 467 708 and BX23 451 699; and*
b. *BX23 453 700, BX23 472 710, BX23 468 717, BX23 454 710, BX23 455 709, BX23 449 716, BX23 450 705 and BX23 451 705.*
c. *The total combined volume of treated wastewater discharged under this consent and CRC131423 shall not exceed 25,614 cubic metres per day over the wastewater irrigation areas shown on Plan CRC153952B.*
d. *For the purposes of compliance with this condition the consent holder shall operate a flow meter which continuously monitors the volume of wastewater discharged to the irrigation area.*

Only effluent from Pines WWTP is conveyed to the irrigation area. The centre pivots have been installed within the areas bound by the coordinates in Condition 2. Therefore, effluent and odours are discharges within the areas on Plan CRC153952A (also shown in Figure 1.3).

Therefore, Conditions 1, 2(a) and 2(b) were all complied with.

3.3 Condition 2(c) – Limits the Daily Volume Discharge to the LTA

Condition 2(c) states that "*The total combined volume of treated wastewater discharged under this consent and CRC131423 shall not exceed 25,614 cubic metres per day over the wastewater irrigation areas shown on Plan CRC153952B*"

Appendix B provides a detailed analysis of the total combined volumes of the daily discharges to land by the 7 centre pivots from 1 July 2018 to 30 June 2019. **Appendix B** shows that all the daily irrigation volumes were significantly below 25,614 m^3/day. The average daily discharge volume during the period under review was 7,896 m^3/day. The largest combined daily discharge volume from the seven irrigators during the period under review was 13,868 m^3/day and this was in February 2019.

Condition 2(c) was complied with during the period under review.

3.4 Condition 2(d) – Flow metering

Condition 2(d) states that "*For the purposes of compliance with this condition the consent holder shall operate a flow meter which continuously monitors the volume of wastewater discharged to the irrigation area.*

Continuous flow metering is carried out to monitor the volume of wastewater discharged to the area. The data collected from these flow meters has been used as the basis for some of the calculations in this report.

Condition 2(d) was complied with during the period under review.

3.5 Condition 3– Matching Influent Volumes to the System Capacities

Condition 3 states that *"The consent holder shall ensure that influent volumes of wastewater do not exceed the operating capacity of the treatment plant and irrigation systems"*

The treatment plan design capacities are provided in Table 1.1. The discharged volumes are presented in **Appendix B** as discussed in Section 3.3 above. The irrigation area has progressively been increased by adding more centre pivot irrigators over the years to meet the influent volume capacities and discussed in Section 3.3 the current daily discharge rate is less than half the maximum consented volume and the installed pivots have the capacity to discharge the maximum consented daily rate of 25,614 m^3/day.

Condition 3 was complied with during the period under review.

3.6 Condition 4 – UV Treatment and Coliform Limits

Condition 4 states that *"The consent holder shall ensure that:*

a. *The discharge receives ultra-violet disinfection prior to irrigation.*
b. *The median concentration of faecal coliforms in the discharge shall not exceed 500 faecal colony forming units per 100 millilitre sample.*
c. *An alarm is fitted to the ultra-violet disinfection system which activates in the event that an inadequate dose is applied.*
d. *The ultra-violet disinfection system is calibrated and serviced annually"*

All effluent is UV treated prior to discharge. UV treatment data is recorded in 1-10-minute time steps. The UV system is maintained and calibrated annually.

Table 3.1 below provides the sampling results for Coliforms and E. Coli.

Table 3.1 - Faecal Coliforms (FEC) and E. coli (ECO) Concentrations (per 100 ml)

	Week 1		Week 2		Week 3		Week 4		Week 5		Monthly Median	
Month	**FEC**	**ECO**	**FEC**	**ECO**	**FEC**	**ECO**	**FEC**	**ECO**	**FEC**	**ECO**	**FEC**	**ECO**
Jul-18							150	60			150	60
Aug-18	110	90	230	110	110	60	13000	9000			170	100
Sep-18	290	150					400	160			345	155
Oct-18	290	80	250	170	20	20	190	70			220	75
Nov-18			370	340	400	200	110	60			370	200
Dec-18	60	20	70	30	140	80	75	30			72.5	30
Jan-19	250	220	280	210	320	240	210	80	330	20	280	210
Feb-19	180	120	130	30	180	40	900	100			180	70
Mar-19	780	780	20	10	350	130	160	100			255	115
Apr-19	150	40	1150	200			130	40			150	40

	Week 1		Week 2		Week 3		Week 4		Week 5		Monthly Median	
Month	**FEC**	**ECO**	**FEC**	**ECO**	**FEC**	**ECO**	**FEC**	**ECO**	**FEC**	**ECO**	**FEC**	**ECO**
May-19	30	30	50	30	730	60	590	190			320	45
Jun-19	810	190	430	90	100	40	40	10			265	65

Table 3.1 also provides the monthly median values for Coliforms and E. Coli. The coliform median values are all below 500 units per 100 ml.

Whenever the individual sampling result readings were greater than 500 cfus/100 ml, a follow up sampling was carried out within a few days and these returned results that were less 500 cfus/100 ml indicating that there was nothing wrong with the system and the few high readings was attributed to the sampling process i.e. the sampling staff was instructed to always ensure that the sampling tap and associated pipework was adequately purged prior to sampling.

Condition 4(b) was complied with.

3.7 Conditions 6 and 41– Permits the Use of Spray Irrigation Only and without End Guns

Condition 6 states that *"The discharge shall occur via a spray irrigation system"*

Condition 41 states that *"There shall be no end guns associated with the wastewater spray irrigation system located on Pt Lot 1 DP 65117 or Pt RS 33357, being that part of the land subject to this consent located north or Burnham School Road"*

The discharge to land is carried out using the seven centre pivots installed in the land described in Condition 2 (a) and (b). The centre pivots do not have end guns.

Thus, both Conditions 6 and 41 were complied with.

3.8 Condition 7 – Limits the Hydraulic Loadings Rates

Condition 7 states that *"The depth of discharge shall not exceed 64 millimetres over any conservative five-day (5) period and no single application shall exceed a depth of 20 millimetres"*

Appendix C presents the average daily application rates (**Appendix C.1-C.7**) under each of the seven pivots and the consecutive 5-day total (**Appendix C.8-C.14**) application rates for each pivot. The daily application rate figures were calculated by dividing the daily discharge volumes presented in **Appendix B** by the area irrigated each day.

There were two times when Pivot 7 was operated in the manual mode during maintenance. The control system DATRAN does not record run time while the pivot is the manual mode. It only records when the pivots are in auto mode. The application depth is calculated based on the flow, area and run time. Therefore, adjustments to the run time had to be made in the calculations for the times when the pivot were in manual mode by manually calculating the actual run time during those periods and using these times to calculate the application depths in the two instances the pivots were in manual mode.

Table 3.2 demonstrates that there were applications that exceeded 64 mm over any consecutive five-day period.

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Condition 7(a) was fully complied with.

Table 3.2 – Irrigation Depths >64 mm Over Any Consecutive 5-Day Period

Month	Pivot 1	Pivot 2	Pivot 3	Pivot 4	Pivot 5	Pivot 6	Pivot 7
Jul-18	0	0	0	0	0	0	0
Aug-18	0	0	0	0	0	0	0
Sep-18	0	0	0	0	0	0	0
Oct-18	0	0	0	0	0	0	0
Nov-18	0	0	0	0	0	0	0
Dec-18	0	0	0	0	0	0	0
Jan-19	0	0	0	0	0	0	0
Feb-19	0	0	0	0	0	0	0
Mar-19	0	0	0	0	0	0	0
Apr-19	0	0	0	0	0	0	0
May-19	0	0	0	0	0	0	0
Jun-19	0	0	0	0	0	0	0

An assessment of the second part of Condition 7 was also carried out. Table 3.3 demonstrates that there were no single application depths that were greater than 20 mm over the period under review.

Table 3.3 – Single Irrigation Depths >20 mm

Month	Pivot 1	Pivot 2	Pivot 3	Pivot 4	Pivot 5	Pivot 6	Pivot 7
Jul-18	0	0	0	0	0	0	0
Aug-18	0	0	0	0	0	0	0
Sep-18	0	0	0	0	0	0	0
Oct-18	0	0	0	0	0	0	0
Nov-18	0	0	0	0	0	0	0
Dec-18	0	0	0	0	0	0	0
Jan-19	0	0	0	0	0	0	0
Feb-19	0	0	0	0	0	0	0
Mar-19	0	0	0	0	0	0	0
Apr-19	0	0	0	0	0	0	0
May-19	0	0	0	0	0	0	0
Jul-18	0	0	0	0	0	0	0

Condition 7(b) was fully complied with.

3.9 Condition 8 – Limits the Monthly Hydraulic Loadings Rates

Condition 8 states that *"The discharge shall not exceed a monthly average hydraulic loading rate of 8 mm per day"*

Table 3.4 summarises the average monthly hydraulic loading rates under each of the centre pivots.

Table 3.4 – Average Daily Monthly Hydraulic Loading Rates (mm/day)

Month/ Year	Centre Pivot 1	Centre Pivot 2	Centre Pivot 3	Centre Pivot 4	Centre Pivot 5	Centre Pivot 6	Centre Pivot 7	Average
Jul-18	6.72	4.12	5.29	6.40	6.04	3.78	3.89	5.18
Aug-18	7.23	6.12	5.74	7.22	7.07	0.00	4.86	5.46
Sep-18	6.70	6.12	7.09	7.97	4.65	0.00	5.57	5.44
Oct-18	7.20	6.97	7.34	7.63	0.92	0.82	4.05	4.99
Nov-18	4.71	4.98	2.18	7.41	1.45	1.84	6.52	4.15
Dec-18	4.91	4.94	4.75	3.24	1.13	3.47	4.49	3.85
Jan-19	6.24	6.06	7.19	3.26	3.26	4.26	0.42	4.38

Month/ Year	Centre Pivot 1	Centre Pivot 2	Centre Pivot 3	Centre Pivot 4	Centre Pivot 5	Centre Pivot 6	Centre Pivot 7	Average
Feb-19	0.41	0.45	4.07	4.67	2.31	3.40	4.30	2.80
Mar-19	3.34	2.95	1.03	3.21	2.41	2.55	5.50	3.00
Apr-19	2.37	3.04	1.70	4.89	3.46	1.55	4.38	3.06
May-19	5.40	4.39	4.53	0.89	4.39	0.02	5.70	3.62
Jun-19	2.67	3.17	3.13	5.26	3.78	3.38	3.17	3.51
Average	**4.82**	**4.44**	**4.50**	**5.17**	**3.40**	**2.09**	**4.40**	**4.12**

Condition 8 was fully complied with.

3.10 Conditions 9 and 21– Concentration of the Treated Effluent Prior to Discharge

Condition 9(a) states that *"Prior to irrigation, the discharge shall be treated to ensure the following standards are met:*

Determinand	***Median***	***95th Percentile***
BOD (g/m³)	*15*	*60*
Suspended Solids (g/m³)	*20*	*90*
Total Nitrogen (g/m³)	*7*	*35*
Total E. Coli cfu/100ml	*500*	*1,000*

**All values are expressed in grams per cubic metre except faecal coliforms which are expressed colony-forming units per 100 millilitre sample.*

b. In order to demonstrate compliance with Condition 9(a), samples of wastewater shall be taken from the pump chamber and analysed at least monthly.

Condition 21 states that *"The discharge shall be sampled from the irrigation pump chamber once per month and analysed for the following:*

a. Biochemical Oxygen Demand.
b. Total Suspended Solids.
c. Total Kjeldahl Nitrogen.
d. Ammoniacal Nitrogen.
e. Faecal coliform".

Table 3.5 below summarises the averaged sampling results collected as required under Condition 9(a) and also under Condition 21. The full schedule of the sampling results raw data is presented in **Appendix D** (Note – Appendix D uses the sampling results – unaveraged). The samples were all collected from the pump chamber in compliance with Condition 9(b) and Condition 21.

Table 3.5 – Sampling Results for Compliance with Condition 9(a) and Provides the Median and the 95th Percentile Values

Month	FEC cfu/100 ml	NH_3 g/m³	NNN g/m³	TKN g/m³	TN g/m³	TP g/m³	ECO cfu/100 ml	T-BOD g/m³	pH	SS g/m³
Jul-18	110	0.478	3.9	2.9	6.7	3.1	43	5.5	7.5	8
Aug-18	2784	0.301	1.7	3.6	4.8	2.0	1892	8.2	7.6	11
Sep-18	980	0.835	1.3	3.2	4.5	3.6	423	5.8	7.5	11
Oct-18	1830	1.532	1.2	3.8	5.0	4.5	1288	6.0	7.7	8
Nov-18	570	0.193	0.7	2.2	2.9	5.7	325	4.8	7.5	6
Dec-18	86	0.984	1.9	3.2	5.1	6.3	40	4.8	7.8	7
Jan-19	278	0.125	2.7	2.0	4.7	3.4	154	3.0	7.8	5
Feb-19	348	0.190	3.9	7.8	6.3	5.1	73	3.3	7.8	7
Mar-19	406	0.114	4.8	2.4	7.2	5.0	86	5.2	7.6	7
Apr-19	1558	0.092	3.7	1.7	5.5	3.4	145	2.8	7.7	3

Month	FEC cfu/100 ml	NH_3 g/m³	NNN g/m³	TKN g/m³	TN g/m³	TP g/m³	ECO cfu/100 ml	T-BOD g/m³	pH	SS g/m³
May-19	406	0.114	4.8	2.4	7.2	5.0	86	5.2	7.6	7
Jun-19	345	0.081	4.8	2.1	6.9	1.2	83	4.0	7.6	5
Median	**406**	**0.192**	**3.2**	**2.6**	**5.3**	**4.0**	**116**	**5.0**	**7.6**	**7**
95th %tile	**2259**	**1.231**	**4.8**	**5.6**	**7.2**	**5.9**	**1560**	**7.0**	**7.8**	**11**

Table 3.6 below combines and compares the consent standards and the measured quanta for BOD, SS, TN and E. Coli. The median and 95th Percentile values in Table 3.5 are compared to the consent conditions in Condition 9.

Table 3.6 – Compliance of Sampling Data with Condition 9(a) Consent Limits

Determinand	Median			95th Percentile		
Determinand	***Consent***	***Measured***	***Complies (Y/N)***	***Consent Limit***	***Measured***	***Complies (Y/N)***
BOD (g/m³)	*15*	*5.0*	***Y***	*60*	*7.0*	***Y***
Suspended Solids (g/m³)	*20*	*7*	***Y***	*90*	*11*	***Y***
Total Nitrogen (g/m³)	*7*	*5.3*	***Y***	*35*	*7.2*	***Y***
Total FC cfu/100ml	*500*	*116*	***Y***	*1,000*	*2,259*	***N***

Table 3.6 shows that the thresholds set in Condition 9 were all complied with except the 95% percentile for the faecal coliforms.

3.11 Conditions 10 – Prohibits Surface Water Ponding

Condition 10 states that *"There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours"*

No ponding beyond 48 hours after an irrigation event occurred under the irrigated area during the period under review.

As noted in Sections 3.8 and 3.9, the irrigation depths applied were below the consent limits. These application depths were still lower than the soils' infiltration capability as there are no reports of observed ponding in the paddocks under any of the pivots for more than 48 hours.

Therefore, Condition 10 was complied with during this period.

3.12 Conditions 11, 13, 14(b) – Nature of the Discharges to the LTA, Source of Wastewater and the LTA Boundary

Condition 11 states that *"The discharge shall be managed to ensure that there shall be no discharge within 20 metres of any surface water body and the run-off of wastewater into any surface waterbody is prevented"*

Condition 14(b) states that *"Effluent shall not be applied (i). Onto land within 50 metres of any active bore or community used for water extraction not owned by the holder of this consent and any community supply protection zones; (ii). Onto land within 20 metres of any surface waterway; (iii). Onto ground with no vegetative cover; (iv.) Onto ground where surface ponding is occurring"*

The discharge areas on Plan CRC153952A are shown in Figure 1.3. There are no waterways within 20 metres of the areas shown on Plan CRC153952A. The effluent was applied to pasture and not on any ground without vegetative cover. No ponding on the ground occurred during the period under review.

Therefore, Conditions 11 and 14(b) were all complied with.

3.13 Conditions 13, 14(a) and 17 – Site Boundaries, Spray Drift and Aerosols

Condition 13(a) states that "*The discharge of treated wastewater shall only occur within the area labelled "Discharge Area A, B and C" on Plan CRC153952A according to the following setback distances: (a)……..*"

Condition 14(a) states that "*The consent holder shall undertake shelter planting as necessary to ensure that the effects of spray and aerosols from wastewater irrigation are not offensive or objectionable beyond the site boundary*"

Condition 17 states that "*The discharge shall be managed to ensure that:*

a. *Aerosols and spray-drift arising from the discharge do not cause offensive or objectionable effects beyond the boundary of the discharge area.*
b. *Any odour resulting from spray irrigation of wastewater shall not result in offensive or objectionable effects on the environment beyond the boundary of the irrigated area*"

The discharge areas on Plan CRC153952A are shown in Figure 1.3. The separation distances stipulated in Condition 13(a)-(c) are complied with.

There were no odour complaints related to Pines treatment plant from residents of Burnham Road during the period under review. There was at least one complaint related to the general odour in the area which was attributed to pig effluent discharge in the surroundings.

Shelterbelts were planted in previous years on most internal boundaries in compliance with Condition 14(a). The shelterbelts are about the 3 m height recommended in the consent conditions. The discharge was applied within the site boundaries and the required setback distances were maintained as discussed in Section 3.2 above.

The Council operates Pivot 7 on a partial circle basis in order to maintain the minimum distances further. Pivot 7 is equipped with actuators and isolation valves for variable irrigation which means that as it nears towards the property boundaries, the sprinklers on the outer edges of the irrigator shutdown and only the sprinklers within the first few spans are operated. This ensures that the minimum distances stipulated in the consent are met.

Therefore, Conditions 13, 14(a) and 17 were all complied with.

3.14 Conditions 18 – Specifies the Cut and Carry Management Regime

Condition 18 states that:

a. *All parts of the discharge area receiving wastewater shall be operated as a cut and carry operation.*
b. *There shall be no harvesting of crops within 48 hours of any wastewater irrigation.*
c. *All pasture harvested from the irrigation areas shall be removed for off-site disposal.*

Condition 18(a)
A cut and carry pasture management regime is operated in all areas receiving wastewater from the treatment plant.

Condition 18(b)
The typical practice is to turn off the irrigation and rest the blocks for 48 hours prior to harvesting. Samples are then taken after the paddock has been rested.

Appendix E shows the dates on which harvesting was carried out (highlighted) and the total nitrogen harvested in kilograms. The table shows with a Irri/No Irr whether (Irri) or not (No Irr) irrigation was applied in the 48 hours preceding the harvesting.

Therefore, Condition 18(b) fully complied with.

3.15 Conditions 22 and 23 – Record Keeping

Condition 22 states that *"Daily records shall be kept of the following:*

a. *The volume of wastewater applied to land (**refer to Appendix B**).*
b. *The irrigation zone over which the discharge is applied (**refer to Appendix C which shows the days the irrigation was applied under each pivot**).*
c. *The depth of the application of wastewater" (**refer to Appendix C**)*

Condition 23 states that *"Monthly records shall be kept of the following:*

a. *The total volume of wastewater applied (**refer to Appendix B**).*
b. *The total depth of wastewater applied (**refer to Appendix C1-C14**).*
c. *The average effluent hydraulic loading rate (**refer to Appendices C and F**).*
d. *The nitrogen loading rate (expressed as kilograms of nitrogen per hectare) (refer to **Table 3.7**).*
e. *The mean dry weight of pasture removed from the site (**refer to Appendix E**).*

The information required under these conditions is recorded and has been the basis for compiling this annual compliance report. The location of this data within this report is shown against each sub-condition above. Some of the information required under Condition 23 is found in **Appendices B, C, E and F**. Effluent nitrogen loading rate (expressed in kg/ha) required under Condition 23(e) are presented in Table 3.7 below.

Table 3.7 – Nitrogen Loading Rates

Month	Monthly Nitrogen Loading (kg/month)							Total for All Centre Pivot's
	Centre Pivot 1	Centre Pivot 2	Centre Pivot 3	Centre Pivot4	Centre Pivot 5	Centre Pivot 6	Centre Pivot 7	
Jul-18	170	116	137	166	195	164	418	1,365
Aug-18	131	111	107	134	175	0	356	1,014
Sep-18	110	104	120	134	112	0	370	950
Oct-18	135	140	142	158	40	52	369	1,037
Nov-18	62	66	47	87	57	85	282	687
Dec-18	104	101	108	100	119	256	346	1,134
Jan-19	110	106	130	86	202	280	83	997
Feb-19	21	25	96	109	233	270	379	1,133
Mar-19	105	100	60	121	309	322	604	1,622
Apr-19	61	76	58	112	266	193	355	1,120
May-19	147	133	136	60	449	32	635	1,592
Jun-19	88	107	106	142	358	319	315	1,435
Total (kg/year)	**1,245**	**1,185**	**1,247**	**1,409**	**2,517**	**1,973**	**4,512**	**14,087**
Pivot Area (ha)	**12.57**	**12.57**	**12.57**	**12.57**	**15.62**	**15.62**	**50.00**	**131.51**
Kg/ha/yr	**99.06**	**94.29**	**99.22**	**112.11**	**161.10**	**126.29**	**90.24**	**107.12**

The average nitrogen loading rate across the irrigated area under the seven centre pivots is 107 kg/ha/year. The consent does not have nitrogen loading rate limits. To provide some context, the previous N loading rates have been collated and these are summarised below:

1. 114 kg/ha in 2017/2018 under CRC153952.
2. 94 kg/ha/year in 2016/2017 under CRC153952.

3. 108 kg/ha/year in 2015/2016 under CRC153952.
4. 99 kg/ha/year in 2014/2015 under CRC131414.
5. 163 kg/ha/year in 2013/2014 under CRC131414.
6. 113 kg/ha/year in 2012/2013 under CRC040099.1.
7. 77 kg/ha/year in 2011/2012 under CRC040099.
8. 201 kg/ha/year in 2010/2011 under the previous consent CRC040099.

3.16 Condition 25 – Groundwater Monitoring

Condition 25 states that *"For the purposes of monitoring the effects of the discharge on groundwater quality, in reference to the bores identified in condition (20):*

c. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall be sampled and analysed at least monthly for nitrate nitrogen and Faecal coliform:

d. In the event that the:

i. concentration of nitrate nitrogen in any of the groundwater samples collected from the down-gradient monitoring bores referred to in clause (a) of this condition exceeds eight (8) milligrams per litre and is at least 30 per cent greater than the nitrate nitrogen concentration in the up-gradient bores also referred to in clause (a) of this condition; or

ii. Faecal coliforms exceeds 50 coliform forming units (cfu)/ per 100 millilitres in any of the monitoring bores established in accordance with clause (a) of this condition.

Then the consent holder shall follow the response procedure outlined in the Excursion Response Plan"

Table 3.8 describes the location of the monitoring bores that were established in compliance with Consent Condition 25.

Table 3.8 – Location of the Monitoring Bores

Bore Number	Location
BX23 / 0204 (Approved for Consent Monitoring)	Upgradient Bores
BX23 / 0205 (Approved for Consent Monitoring)	
BX23/0878 (Approved for Consent Monitoring)	
M36 / 7461 (Used for Operations monitoring)	Downgradient Bores
M36 / 7462 (Used for Operations monitoring)	
M36 / 20415 (Used for Operations monitoring)	
M36 / 7667 (Used for Operations monitoring)	
M36 / 7668 (Used for Operations monitoring)	
M36 / 7463 (Used for Operations monitoring)	
M36 / 20416 (Used for Operations monitoring)	
M36 / 7464 (Approved for Consent Monitoring)	
BX23 / 0206 (Approved for Consent Monitoring)	
BX23 / 0207 (Approved for Consent Monitoring)	
BX23 / 0208 (Approved for Consent Monitoring)	

Figure 3.1 shows some of the groundwater bores upgradient and downgradient of the irrigation blocks.

Condition 25(c) was complied with as the monthly monitoring of nitrates and E. Coli was carried out throughout the reporting period. The samples were collected to meet the normal monthly sampling requirements and the requirements to meet the ERP reporting. The nitrate-nitrogen

and are presented in **Appendix F** and presented pictorially in Figure 3.2 below. Table 3.9 provides a summary of the nitrate samples. **Appendix F** and Table 3.9 show that for Bore BX23/0206 the sampling done on 28/8/2018, 5/9/2018, 30/10/2018 and 18/12/2018 reported higher levels of Nitrates.

Figure 3.1 – Location of Some of the Sampling Bores

Table 3.9 – Summary of the Nitrate Concentrations Exceeding Condition 25d(i)

	Upstream Bores (Nitrates g/m³)	**Downstream Bores (Nitrates g/m³)**
Date	**BX23/0205**	**BX23/0206**
28-Aug-18	4.1	8.4
5-Sep-18	6.3	8.7
30-Oct-18	6.5	9.2
18-Dec-18	5	8.5

To determine compliance with Condition 25d(ii) the faecal coliform sampling was carried out and the results from the bore samples are presented in **Appendix F** and summarised in Table 3.10 below.

All the four downstream monitoring bores BX23/0206, BX23/0207, M36/ 7464 and BX 23/ 0208 complied with the condition 25d (ii). A number of samples were also taken from the operations monitoring bore M36/7462 and M36 /20416 and these returned higher levels of faecal coliforms as listed in Table 3.10

Table 3.10 – Summary of the Total Coliform Samples Exceeding 50 cfu/100L

Date	Upstream Bores (cfu/100 mL)	Downstream Bores (cfu/100 mL)
	M36/7462	M36/20416
	FC	FC
20-Nov-18	<1	210
28-Feb-19	510	4

Table 3.10 shows that all but the following samples exceeded the faecal coliform threshold of 50 cfu/100 mL÷

- Bore M36/20416 sample from 20 November 2018 which had a result of 210 cfu/100 ml.
- Bore M36/7462 sample from 28 February 2019 which had a result of 510 cfu/100 ml.

The sampling procedure followed during the sampling were discussed with the samplers. Sampling site is in close proximity to the pig effluent discharge area which suggested that the exceedances may have been as a result of the external effluent discharge and its residual effects and not from the Pines Plant irrigation.

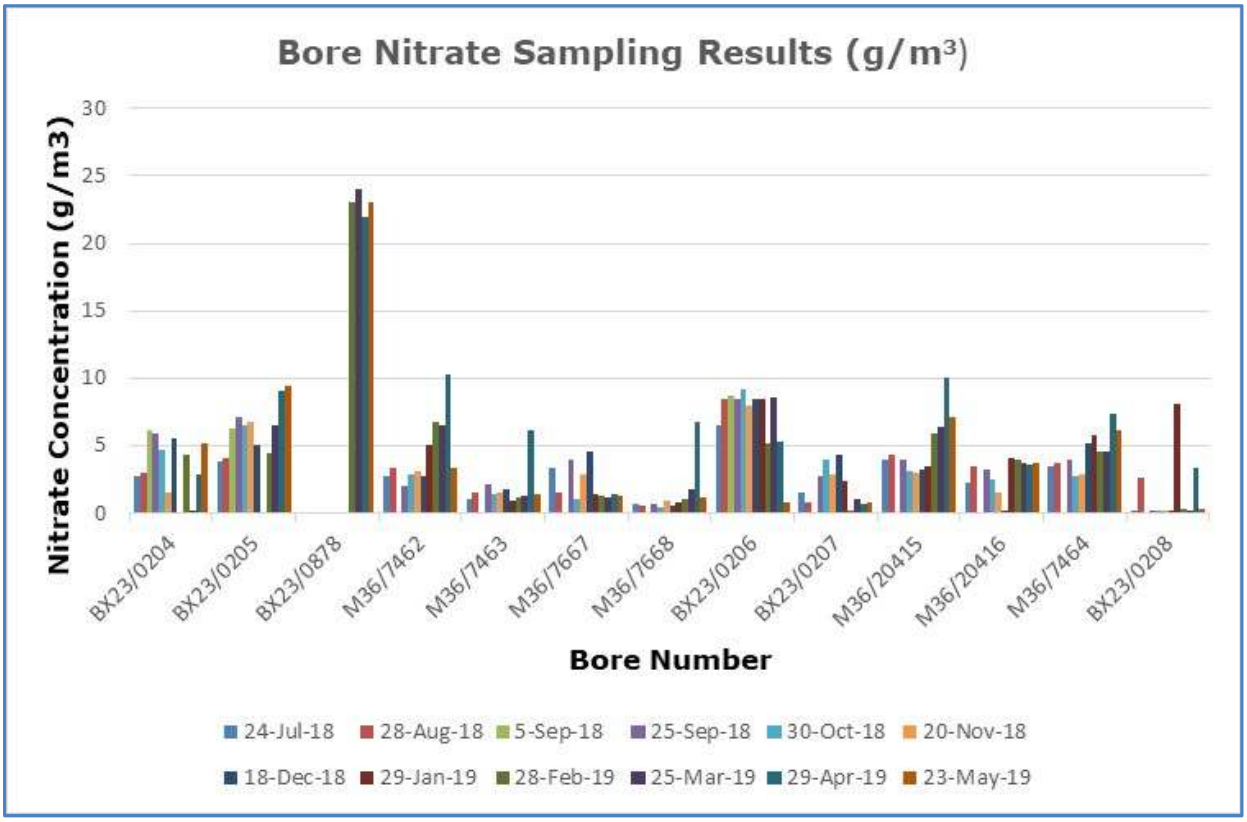


Figure 3.2 – Bore Nitrate Concentration Sampling Results

A number of measures were identified and implemented to control the external effluent discharge around the Pines bores. The results of the subsequent samples complied with Condition 25(d(i).

3.17 Condition 26 – Soils Sampling

Condition 26 states that *"For the purposes of monitoring the effects of the discharge on soils:*

a. *Samples of soil shall be collected twice annually from the land beneath each centre pivot irrigator or k-line irrigation area that has received treated wastewater irrigation in the previous six (6) months.*
b. *Sampling shall occur between a depth of zero (0) and 50 millimetres.*
c. *A minimum of four (4) samples shall be taken from each area sampled and all samples from the wastewater irrigation site shall be combined into a single composite sample and be analysed for the following:*

i. *Total cadmium*
ii. *Total chromium*
iii. *Total copper*
iv. *Total lead*
v. *Total nickel*
vi. *Total zinc*
vii. *Total nitrogen*
viii. *Total mercury*
ix. *Total arsenic"*

Soil sampling was carried out on various dates is presented in **Appendix G**.

3.18 Condition 27– Soils Sampling Limits

Condition 27 states that:

a. *If any of the results of any of the analysed samples in accordance with condition 26 exceed the thresholds specified in clause (b) of this condition the consent holder shall:*
i. *Cease wastewater irrigation over that irrigation area.*
ii. *Advise the Canterbury Regional Council within ten (10) days of the receipt of the results, and outline the steps taken to address elevated soil concentrations, including any remediation or mitigation measures.*
iii. *Not recommence wastewater irrigation over that irrigation area until further sampling demonstrates to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, compliance with the thresholds specified in clause (b) of this condition.*

b.

Trace Element	***Limit (milligrams per kilogram) dry weight***
Total Cadmium	*1*
Total Chromium	*600*
Total Copper	*100*
Total Lead	*300*
Total Nickel	*60*
Total Zinc	*300*
Total Mercury	*1*
Total Arsenic	*20*

The soil sampling results are presented in **Appendix G**. The monitoring results are all within the consented limits and therefore complied with Condition 27.

Therefore, Condition 27 was fully complied with.

3.19 Condition 28– Laboratory Qualifications

Condition 28 states that "*All samples required under this consent shall be taken by a suitably qualified and experienced person, and shall be analysed using methods approved by the American Public Health Association or the American Society for the Testing of Materials by a laboratory that is accredited for that method of analysis by International Accreditation New Zealand (IANZ) or by an organisation with a mutual agreement with IANZ*"

Aqualinc Limited are contracted to undertake the soil sampling. The soil samples were all analysed by Hill Laboratories which is IANZ accredited.

3.20 Condition 30 – Annual Monitoring Plan

Condition 30 states that "*The consent holder shall provide the Canterbury Regional Council with an Annual Monitoring Report each year commencing 12 months from the date of the exercise of this consent. The Annual Monitoring Report shall include, but not be limited to:*

a. Monthly monitoring records.
b. All sampling results required under the conditions of consent.
c. Annual average nitrogen loading rate.
d. A record of any complaints from members of the public and actions taken.
e. Status of compliance with consent conditions.
f. Reasons for any non-compliances and actions taken or planned to prevent re-occurrences.

This report then becomes the formal record of results for that year"

Condition 30 (a) – (c), (e) and (f)
These have been presented and discussed in the previous sub-sections. The status of compliance has also been discussed where necessary.

Condition 30 (d) – Complaints from the Public
There were no complaints during the period under review.

3.21 Condition 36 – Issues Related to Plan Change 8 (PC8)

Condition 36 states that "*When discharging wastewater to land adjacent to the Plan Change land, the consent holder shall ensure that:*

a. The discharge shall be in an aerobic state.
b. The dissolved oxygen concentration shall not be less than a trigger level of 0.5 grams per cubic metre.
c. The dissolved oxygen concentration in the discharge shall be continuously monitored and an alarm fitted that activates in the event that the dissolved oxygen concentration is less than the trigger level in clause (b) of this condition.
d. The dissolved oxygen monitoring device shall be calibrated and serviced annually"

Plan Change 8 (PC8) became operative in 2012 and therefore Conditions 35-42 have to be complied with. The following sub-sections discuss these conditions.

The discharge from the Pines Wastewater Treatment Plant is aerobic in nature. Thus, Condition 36(a) is complied with.

DO levels are monitored continuously with time stamped data recorded every 1-10 minutes every hour every day over the period under review. The DO data when averaged on an hourly

or daily basis or some other time frame complies with the minimum 0.5 g/m^3 stipulated in Condition 36(b).

The DO meter is calibrated and serviced annually in compliance with Condition 36(c).

3.22 Condition 39 – Mitigation Measures if DO and E Coli Limits are Exceeded

Condition 39 states that "*If the minimum level of dissolved oxygen concentration specified in Condition 36(b) is breached, or the median concentration of faecal coliforms is greater than 500 colony forming units per 100 millilitre sample, then the following provisions shall apply:*

a. Any discharge of treated wastewater to land adjacent to the Plan Change land shall be setback no less than 200 metres from the common boundary as shown on Plan CRC101109.1C when the winds of any strength are from 170°N to 310°N; provided that

b. When the winds are not from 170°N to 310°N any discharge of treated wastewater shall comply with the setback distances prescribed by Condition 40.

The minimum DO levels in Condition 36(b) have been complied with during the period under review when the DO data is averaged over a time range (e.g. hourly, daily etc.).

One improvement that the Council made during the previous reporting period (as a control measure) was to set up the system such that if there is a low DO alarm in the CP5 prohibited zone, the pivot is programmed to stop irrigating and to then move out of that zone without discharging any effluent with low DO in the prohibited zone.

As demonstrated in Section 3.6 for Condition 4, the E. Coli sampling results showed compliance with the condition requiring the median values to be <500 cfu/100 mL.

The separation distance with the residential land boundary is > 200 metres. Further recent improvements include installation of isolation valves and actuators to enable the outer sprinklers to be shut as the pivot gets closer to the property boundaries associated with Plan Change 8.

3.23 Condition 40 – Shelterbelts and Irrigation Boundaries

Condition 40 states that "*In respect of shelter belt planting:*

a. The consent holder shall establish a shelter belt comprising three rows of closely planted evergreen trees along the common boundary defined under Condition 39(i).

b. No discharge of treated wastewater to land shall occur within 150 metres of that common boundary until;

i. the trees referred to in Condition 40(a) have reached a consistent minimum height of three (3) metres and have developed into a dense continuous shelter belt without gaps; and

ii. the consent holder has demonstrated to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that the boundary plantings comply with Condition 40(b)(i).

c. Following confirmation pursuant to condition 40(b)(ii), discharge of treated wastewater to land may occur up to 25 metres from the common boundary defined under Condition 39(i).

The shelterbelts stipulated in Condition 40 was planted along the internal boundaries and these will, in time, meet the shelter planting height requirements of 3 metres. At present no discharge to land occurs within 150 m of the common boundary. As noted in the preceding

sections, Pivot 7 was reconfigured in the 2017-2018 reporting year to ensure that the separation distances are achieved while irrigating as much area under the pivot as possible.

3.24 Condition 42 – Management of the Irrigation System Adjacent to the PC8 Land

Condition 42 states that *"In the event of cessation of irrigation from the wastewater spray irrigation system for more than 24 hours on land adjacent to the Plan Change land, the consent holder shall not start up irrigation from the spray irrigation system within 200 metres of the common boundary defined under Condition 39(i)"*

The irrigation system is operated in compliance with Condition 42.

3.25 Condition 43 – Design Specifications for the Centre Pivots Adjacent to the PC8 Area

Condition 43 states that "*No discharge of treated wastewater to land from a spray irrigation system shall occur within 150 metres of the common boundary defined under Condition 38(i) unless:*

a. *The spray nozzles are no more than two (2) metres above ground level.*
b. *The spray nozzles produce large consistent droplets such as produced by the Nelson R3000 brand or similar product.*
c. *The operating pressure at the spray irrigation nozzle does not exceed 103 kilopascals (kPa).*

The centre pivot spray droppers are within 2 m of the ground level. Nelson R3000 nozzles are used on the Centre Pivots and they are designed to operate within a pressure range of 80-100 kPa.

Thus, Condition 43 was complied with.

4 Contingence Measures and Actions to Achieve Compliance

4.1 General

In accordance with Consent Condition 30(f), SDC is required to address issues of non-compliance identified and to also provide proposals on how best to improve the operation of the system to achieve full compliance.

This section identifies, discusses and provides action plans on how best to address the non-compliances identified in Section 3 relating to consent CRC153952.

4.2 Condition 25 – Groundwater Monitoring

Condition 25 was identified as area for improvement when it comes to controlling of external effluent discharge in the bore surrounding. The Operators at site have been instructed to be vigilant on effluent discharges. The Land Lessee has also been instructed to avoid any such discharges on the land surrounding the bores.

4.3 Condition 9 – Treated Wastewater Quality

The 95th percentile for the faecal coliforms was exceeded during the period under review. Section 4.4 outlines the on-going improvements. The commissioning of the additional bioreactor and the UV will ensure on-going compliance with Condition 9.

4.4 Other On-going Improvements

On-going improvements are being carried out to ensure compliance with all consent conditions. Examples of these are:

i. Training of operators on this improved the monitoring and hence the compliance of the system.
ii. Increasing the capacity of Centre Pivots 5 & 6 by adding spans to give an additional gross irrigated area of 56.5 ha (approx.) across the Pines.
iii. Diligently managing the internal checklist used for tracking all the consent conditions. This is monitored on a regular basis. The wastewater team members have monthly meetings wherein they discuss all operational aspect of the wastewater system and the compliance requirements.
iv. Consistently updating and addressing issues identified on the risk register created in 2017-2018. The risks are continually reviewed and ranked with the appropriate actions implemented.
v. Pines III upgrade works have been completed. The additional bioreactor and the UV treatment bay has been commissioned. The management plan was reviewed to identify any changes required in the operations activity. The upgrades being similar to the existing systems, there is no notifiable change proposed to the activity management plan. However, during this year's review, as an update, some wordings have been added to reflect the current configuration of the plant along with some proposed improvements in the operations as required in Section 19. This has been shared with ECan before being adopted as operating management plan at site.

These changes and improvements have resulted in the improved operation of the system and compliance with the consent conditions.

4.5 Summary

The preceding sections have provided options and action plans for dealing with any observed non-compliances.

5 Conclusions

This report has assessed the compliance of Consent CRC153952. The report has shown that all the consent conditions are complied with except for the 95th percentile threshold for coliforms. The on-going improvements outlines in Section 4 will ensure on-going compliance.

Appendix A Consent Conditions for CRC153952

RESOURCE CONSENT CRC153952

1	The discharge shall be only: a. Treated wastewater originating from the Pines Wastewater Treatment Facility located at Lot 1 DP 309881, Burnham School Road, Burnham as shown on Plan CRC153952A; and b. Odour and aerosols associated with the spray irrigation of treated wastewater.
2	The discharge shall only occur within Wastewater Discharge Area A, B and C shown on Plan CRC153952B, and bound by Topo50 map references: a. Topo50 BX23 459 672, BX23 472 699, BX23 467 708 and BX23 451 699; and b. Topo50 BX23 453 700, BX23 472 710, BX23 468 717, BX23 454 710, BX23 455 709, BX23 449 716, BX23 450 705 and BX23 451 705. c. The total combined volume of treated wastewater discharged under this consent and CRC131423 shall not exceed 25,614 cubic metres per day over the wastewater irrigation areas shown on Plan CRC153952B. d. For the purposes of compliance with this condition the consent holder shall operate a flow meter which continuously monitors the volume of wastewater discharged to the irrigation area.
3	The consent holder shall ensure that influent volumes of wastewater do not exceed the operating capacity of the treatment and irrigation systems.
4	The consent holder shall ensure that: a. The discharge receives ultra-violet disinfection prior to irrigation. b. The median concentration of faecal coliforms in the discharge shall not exceed 500 faecal colony forming units per 100 millilitre sample. c. An alarm is fitted to the ultra-violet disinfection system which activates in the event that an inadequate dose is applied. The ultra-violet disinfection system is calibrated and serviced annually.
5	Alarm systems shall be installed at the treatment plant to warn of a power failure or a failure of any critical treatment system components. Standby power generation shall be available at all times the plant is operational.
6	The discharge shall occur only via a spray irrigation system.
7	The application depth of the discharge shall not exceed 64 millimetres over any consecutive five (5) day period, and no single application shall exceed a depth of 20 millimetres.
8	The discharge shall not exceed a monthly average hydraulic loading rate of eight (8) millimetres per day.
9	a. Prior to irrigation, the discharge shall be treated to ensure the following standards are met: Parameter / Median* / 95th Percentile* Biochemical Oxygen Demand (BOD) / 15 / 60 Suspended Solids / 20 / 90 Total Nitrogen / 7 / 35 Faecal Coliforms (cfu/100ml) / 500 / 1,000 *All values are expressed in grams per cubic metre except faecal coliforms which are expressed colony-forming units per 100 millilitre sample. b. In order to demonstrate compliance with Condition 9(a), samples of wastewater shall be taken from the pump chamber and analysed at least monthly.
10	There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours.

11	The discharge shall be managed to ensure that there shall be no discharge within 20 metres of any surface water body and the run-off of wastewater into any surface waterbody is prevented.
12	All stockwater races within the wastewater irrigation areas shown on Plan CRC153952D shall be piped or otherwise closed by 28 February 2017.
13	The discharge of treated wastewater shall only occur within the area labelled "Discharge Area A, B and C" on Plan CRC153952B according to the following setback distances: a. Discharge Area A" no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *"Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land" or its successor, with wastewater spray irrigation set back by:* *i. No less than 40 metres from any site boundary where complying shelter is established*; or* ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.* b. Within "Discharge Area B" no wastewater spray irrigation shall commence within 150 metres of any site boundary until shelter planning is established to a minimum height of three (3) metres. At the commencement of wastewater spray irrigation, all shelter planting shall comply with the Department of Public Health Public Health Services 1992 guidelines *"Public Health Guidelines for the safe use of sewage effluent and sewage sludge on land" or its successor, with wastewater spray irrigation set back by:* i. *No less than 15 metres from any site boundary where complying shelter is established*; or* ii. *No less than 150 metres from any site boundary where shelter planting is absent, is less than three (3) metres in height, or does not meet this guideline.* c. Within "Discharge Area C" no wastewater spray irrigation shall commence within 10 metres of any site boundaries.
14	a. The consent holder shall undertake shelter planting as necessary to ensure that the effects of spray and aerosols from wastewater irrigation are not offensive or objectionable beyond the site boundary. * Note Wastewater spray irrigation is also precluded from occurring on Pt Lot 2 DP 82068 (as per the conditions of the designation) b. Effluent shall not be applied: i. Onto land within 50 metres of any active community used for water extraction not owned by the holder of this consent and any community supply protection zones; ii. Onto land within 20 metres of any surface waterway; iii. Onto ground with no vegetative cover; iv. Onto ground where surface ponding is occurring; and v. There shall be no ponding of effluent on the land irrigation system area for any period exceeding 48 hours. c. The consent holder shall prepare a Landscape Plan and shall provide it to the Canterbury Regional Council, Attn: RMA Compliance and Enforcement Manager prior to the commencement of planting confirming that the planting is consistent with the requirements of the Department of Public Health Public Health Services 1992 Guideline or its successor. The Landscape Plan shall include, but not be limited to, the following information: i. The location and extent of each area of shelter planting. ii. The species to be planted and the anticipated height of each plant following establishment. iii. The minimum plant size and spacing required at planting to achieve the minimum plant height defined in clause (b) of this condition prior to the commencement of wastewater spray irrigation. d. Once established the landscaping shall be maintained for the duration of the exercise of the consent, with any dead, dying or diseased plants being replaced within one growing season within plants of a similar species and in accordance with the planting specified in the Landscape Plan required under clause (c).
15	a. The discharge area shall be fenced to prevent stock, vehicle and public access.

	b. At either end of the discharge area along Burnham School Road an easy visible sign should state "Potential Health Risks from Aerosolised treated sewage in this area".
16	A notice shall be erected and maintained at all entrances to the site. This notice shall be legible at a distance of five (5) metres and shall inform the public of the nature of the activities occurring at the site, and that the disposal or waste by any other person is prohibited.
17	The discharge shall be managed to ensure that: a. Aerosols and spray-drift arising from the discharge do not cause offensive or objectionable effects beyond the boundary of the discharge area. b. Any odour resulting from spray irrigation of wastewater shall not result in offensive or objectionable effects on the environment beyond the boundary of the irrigated area.
18	a. All parts of the discharge area receiving wastewater shall be operated as a cut and carry operation. b. There shall be no harvesting of crops within 48 hours of any wastewater irrigation. c. All pasture harvested from the irrigation areas shall be removed for off-site disposal.
19	A Management Plan shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, at least two (2) months prior to the exercise of this consent. The Management Plan shall: a. Set out how the activity authorised by this consent shall be operated to enable compliance with the consent conditions. b. Be maintained at all times and any changes to the Management Plan shall be submitted to the Canterbury Regional Council prior to those changes taking effect.
20	The Management Plan referred to in Condition 19 shall include, but not be limited to, the following: a. The method of sampling chemicals, quantities of wastewater and frequency of sampling throughout the operation. b. The testing and calibration of all systems including backup generator, telemetry, and flow meters. c. Sub-condition cancelled. d. The monthly monitoring programme of the onsite bores identified on Plan CRC153952C.
21	The discharge shall be sampled from the irrigation pump chamber once per month and analysed for the following: a. Biochemical Oxygen Demand. b. Total Suspended Solids. c. Total Kjeldahl Nitrogen. d. Ammoniacal Nitrogen. e. Faecal coliforms.
22	Daily records shall be kept of the following: a. The volume of wastewater applied to land. b. The irrigation zone over which the discharge is applied. c. The depth of the application of wastewater.
23	Monthly records shall be kept of the following: a. The total volume of wastewater applied. b. The total depth of wastewater applied. c. The average effluent hydraulic loading rate. d. The nitrogen loading rate (expressed as kilograms of nitrogen per hectare).

	e. The mean dry weight of pasture removed from the site.
24	Prior to the exercise of the consent, the consent holder shall review and update as necessary the 'Excursion Response Plans' (ERP) included in the application to be consistent with the conditions of consent, and submit a copy of the revised ERP to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager. Thereafter the ERP shall be maintained at all times and any changes to the ERP shall be submitted to the Canterbury Regional Council prior to those changes taking effect.
25	For the purposes of monitoring the effects of the discharge on groundwater quality, in reference to the bores identified in condition (20): a. The consent holder shall establish and maintain a minimum of three (3) on-site monitoring bores located down-gradient of the irrigation area and two (2) on-site monitoring bores located up-gradient of the irrigation area for the duration of this consent. b. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall have screened sections extending from two (2) metres below the lowest water level to one (1) metre above the highest water level. c. Groundwater from the monitoring bores established in accordance with clause (a) of this condition shall be sampled and analysed at least monthly for nitrate nitrogen and Faecal coliform: d. In the event that the: i. concentration of nitrate nitrogen in any of the groundwater samples collected from the down-gradient monitoring bores referred to in clause (a) of this condition exceeds eight (8) milligrams per litre and is at least 30 per cent greater than the nitrate nitrogen concentration in the up-gradient bores also referred to in clause (a) of this condition; or ii. Faecal coliforms exceeds 50 coliform forming units (cfu)/ per 100 millilitres in any of the monitoring bores established in accordance with clause (a) of this condition; Then the consent holder shall follow the response procedure outlined in the Excursion Response Plan.
26	For the purposes of monitoring the effects of the discharge on soils: a. Samples of soil shall be collected twice annually from the land beneath each centre pivot irrigator or k-line irrigation area that has received treated wastewater irrigation in the previous six (6) months. b. Sampling shall occur between a depth of zero (0) and 50 millimetres. c. A minimum of four (4) samples shall be taken from each area sampled and all samples from the wastewater irrigation site shall be combined into a single composite sample and be analysed for the following: i. Total cadmium ii. Total chromium iii. Total copper iv. Total lead v. Total nickel vi. Total zinc vii. Total nitrogen viii. Total mercury ix. Total arsenic
27	a. If any of the results of any of the analysed samples in accordance with condition 26 exceed the thresholds specified in clause (b) of this condition the consent holder shall: i. Cease wastewater irrigation over that irrigation area. ii. Advise the Canterbury Regional Council within ten (10) days of the receipt of the results, and outline the steps taken to address elevated soil concentrations, including any remediation or mitigation measures.

	iii. Not recommence wastewater irrigation over that irrigation area until further sampling demonstrates to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, compliance with the thresholds specified in clause (b) of this condition. b. Trace Element — Limit (milligrams per kilogram) dry weight Total Cadmium — 1 Total Chromium — 600 Total Copper — 100 Total Lead — 300 Total Nickel — 60 Total Zinc — 300 Total Mercury — 1 Total Arsenic — 20
28	All samples required under this consent shall be taken by a suitably qualified and experienced person, and shall be analysed using methods approved by the American Public Health Association or the American Society for the Testing of Materials by a laboratory that is accredited for that method of analysis by International Accreditation New Zealand (IANZ) or by an organisation with a mutual agreement with IANZ.
29	The results of all samples taken under this consent shall be provided to the Canterbury Regional Council within ten (10) working days of receipt of the samples.
30	The consent holder shall provide the Canterbury Regional Council with an Annual Monitoring Report each year commencing 12 months from the date of the exercise of this consent. The Annual Monitoring Report shall include, but not be limited to: a. Monthly monitoring records. b. All sampling results required under the conditions of consent. c. Annual average nitrogen loading rate. d. A record of any complaints from members of the public and actions taken. e. Status of compliance with consent conditions. f. Reasons for any non-compliances and actions taken or planned to prevent re-occurrences. This report shall then become the formal record of results for that year.
31	a. Prior to the construction of the Pines Wastewater Treatment Facility, design plans shall be certified by a Chartered Professional Engineer (CPEng) with at least five (5) years' experience in the design and construction of wastewater treatment systems to confirm that the system has been suitably designed to achieve or better the values set out in Condition 10(a). b. A copy of the certified design plans shall be submitted to the Canterbury Regional Council, Attention: Environmental Compliance Manager, at least one month prior to construction.
32	a. Prior to the exercise of this consent, the consent holder shall establish a reticulated water supply which provides sufficient water to cover the property holders domestic needs to the properties located within the area bound by Brookside Road, Ellesmere Junction Road and Edwards Road. b. The consent holder shall maintain the reticulated supply for the duration of this consent and ensure the quality of water supplied complies with New Zealand Drinking Water Standards 2008 criteria.

33	a. In the event of any disturbance of Koiwi Tangata (human bones) or taonga (treasured artefacts), during the construction or installation of the treatment and disposal facilities, the consent holder shall immediately: i. Cease earthmoving operations in the affected area ii. Mark off the affected area until earthmoving operations recommence iii. Advise the Canterbury Regional Council of the disturbance iv. Advise the Upoko Runanga of Te Taumutu Runanga, or their representative (contact information can be obtained from the Canterbury Regional Council), and the New Zealand Historic Places Trust, of the disturbance. b. Earthmoving equipment operations shall not recommence until either; i. the consent holder provides a certificate in writing to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, signed by Upoko Runanga of Taumutu, or their representative(s), stating that appropriate action has been undertaken in relation to the discovered culturally sensitive material; or ii. after five (5) working days after advising the Taumutu Runanga, a certificate signed by an archaeologist (i.e., a person with a post graduate degree in archaeology, and who is a member of the New Zealand Archaeological Association) is provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that states that in the archaeologist's opinion appropriate action has been undertaken in relation to the discovered culturally sensitive material. That certificate shall detail the action that has been undertaken by the consent holder. A copy of the archaeologist's qualifications shall also be provided with any such certificate.
34	The lapsing provisions of Section 125 of the Resource Management Act 1991 shall not apply to this consent until 31 March 2030.
35	The Canterbury Regional Council may, once per year, on any of the last five (5) working days of March or September serve notice of its intention to review the conditions of this consent for the purposes of either of the following: a. Dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage. b. Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.
36	Specific Conditions in respect of proposed Plan Change 8 Land Private Plan Change 8 to the Selwyn District Plan seeks to re-zone the land shown on Plan CRC101109.1C ("the Plan Change land") from Outer Plains zone to Residential Living 3 zone for rural residential development. Conditions 35 to 42 are contingent on rural residential re-zoning of the Plan Change land becoming operative, and in which case the following additional conditions shall apply.
36	When discharging wastewater to land adjacent to the Plan Change land, the consent holder shall ensure that: a. The discharge shall be in an aerobic state. b. The dissolved oxygen concentration shall not be less that a trigger level of 0.5 grams per cubic metre. c. The dissolved oxygen concentration in the discharge shall be continuously monitored and an alarm fitted that activates in the event that the dissolved oxygen concentration is less than the trigger level in clause (b) of this condition. d. The dissolved oxygen monitoring device shall be calibrated and serviced annually.
37	The requirements of Conditions 36(c) and 36(d) shall be undertaken by the consent holder for a minimum of at least two (2) years from the date of commencement of spray irrigation of wastewater to land in accordance with this consent.
38	The requirements of Conditions 36(c) and 36(d) shall no longer apply upon provision of a certificate signed by the person responsible for designing the wastewater irrigation system, or by a chartered Professional Engineer (CPEng), to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, certifying that; a. dissolved oxygen in the discharge has been continuously monitored for at least two (2) years; and b. the minimum level of dissolved oxygen concentration specified in Condition 36(b) has been continuously met or exceeded during that two (2) year period.

39	If the minimum level of dissolved oxygen concentration specified in Condition 36(b) is breached, or the median concentration of faecal coliforms is greater than 500 colony forming units per 100 millilitre sample, then the following provisions shall apply: a. Any discharge of treated wastewater to land adjacent to the Plan Change land shall be setback no less that 200 metres from the common boundary as shown on Plan CRC101109.1C when the winds of any strength are from 170°N to 310°N; provided that b. When the winds are not from 170°N to 310°N any discharge of treated wastewater shall comply with the setback distances prescribed by Condition 40.
40	In respect of shelter belt planting: a. The consent holder shall establish a shelter belt comprising three rows of closely planted evergreen trees along the common boundary defined under Condition 39(a). b. No discharge of treated wastewater to land shall occur within 150 metres of that common boundary until; i. the trees referred to in Condition 40(a) have reached a consistent minimum height of three (3) metres and have developed into a dense continuous shelter belt without gaps; and ii. the consent holder has demonstrated to the satisfaction of the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that the boundary plantings comply with Condition 40(b)(i). c. Following confirmation pursuant to condition 40(b)(ii), discharge of treated wastewater to land may occur up to 25 metres from the common boundary defined under Condition 39(a).
41	There shall be no end guns associated with the wastewater spray irrigation system located on Pt Lot 1 DP 65117 or Pt RS 33357, being that part of the land subject to this consent located north or Burnham School Road.
42	In the event of cessation of irrigation from the wastewater spray irrigation system for more than 24 hours on land adjacent to the Plan Change land, the consent holder shall not start up irrigation from the spray irrigation system within 200 metres of the common boundary defined under Condition 39(a).
43	No discharge of treated wastewater to land from a spray irrigation system shall occur within 150 metres of the common boundary defined under Condition 38(i) unless: a. The spray nozzles are no more than two (2) metres above ground level. b. The spray nozzles produce large consistent droplets such as produced by the Nelson R3000 brand or similar product. c. The operating pressure at the spray irrigation nozzle does not exceed 103 kilopascals (kPA).

Appendix B Daily Discharge Volumes for Condition 2(b)

Appendix B – Total Combined Daily Volumes (m^3)

Day	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
1	6,589.2	6,654.0	7,240.5	6,807.2	7,665.8	7,716.6	6,016.7	6,621.3	7,595.4	7,371.6	6,568.8	11,140.3
2	6,243.1	6,601.7	6,627.2	7,087.6	7,714.0	7,814.4	6,683.0	6,742.5	7,237.5	7,971.8	6,898.2	5,697.7
3	7,417.4	6,519.6	8,995.9	7,111.8	7,576.1	8,068.9	6,747.8	6,943.8	7,492.2	7,495.1	7,026.1	7,406.8
4	7,436.6	6,857.6	7,800.7	7,286.9	7,952.9	8,941.6	6,560.7	6,509.8	6,356.0	6,937.2	7,190.9	7,236.8
5	6,353.2	6,759.1	7,288.7	6,472.6	7,729.0	7,123.8	6,465.2	6,266.9	7,337.5	8,499.3	7,319.5	7,196.2
6	6,878.4	6,582.4	7,068.0	7,511.0	7,191.3	7,771.4	6,546.5	6,103.7	6,982.5	8,200.5	6,914.5	5,874.7
7	7,424.1	6,863.6	7,354.1	6,798.4	7,125.4	8,540.2	7,078.0	6,573.8	7,190.5	279.0	6,874.4	6,056.0
8	6,434.1	6,570.8	7,250.3	8,373.5	7,372.2	7,617.4	7,024.5	6,827.2	7,407.5	7,511.6	7,005.8	7,421.2
9	6,040.8	6,779.4	7,363.9	7,754.1	10,505.3	7,476.2	6,882.9	6,682.0	7,437.7	6,931.6	7,192.4	7,643.7
10	6,583.1	6,440.2	6,586.8	4,422.7	8,416.6	7,466.0	6,970.4	6,653.1	7,452.2	6,448.0	7,071.4	7,207.0
11	6,141.3	7,288.0	6,873.9	5,099.9	8,223.5	6,773.1	6,917.8	7,057.0	7,731.3	7,248.8	6,833.0	8,111.2
12	6,216.0	6,905.6	5,977.8	5,578.5	7,819.8	7,107.0	6,999.0	6,714.3	7,221.9	6,611.9	7,368.6	7,305.5
13	6,472.6	6,830.9	6,722.0	8,044.7	7,464.2	7,098.3	7,225.0	13,868.3	7,570.1	6,931.9	7,115.5	6,120.0
14	6,425.2	6,547.0	6,578.5	7,585.3	7,889.9	7,029.8	8,441.5	7,186.4	6,695.8	7,223.7	7,061.0	5,654.9
15	6,489.0	6,834.6	7,177.6	7,195.4	7,194.4	7,590.3	7,707.5	6,283.6	7,170.2	7,112.9	7,095.3	6,516.1
16	6,610.9	6,603.5	7,419.1	6,653.1	7,282.8	7,024.7	7,437.3	6,979.1	7,544.4	6,966.7	7,075.0	6,693.5
17	6,851.8	6,767.9	6,723.4	7,337.5	6,435.3	5,560.2	6,940.9	7,086.4	7,216.5	6,930.0	6,987.9	6,426.4
18	6,839.6	7,387.1	6,889.7	6,651.2	7,236.1	5,437.7	7,984.7	7,337.5	7,330.9	6,482.4	7,325.4	6,918.2
19	6,214.9	7,432.6	6,748.6	7,067.5	8,570.2	6,959.5	6,926.7	7,209.6	7,435.3	6,934.8	7,631.3	7,081.6
20	6,057.7	6,732.8	7,254.3	7,019.6	8,738.3	7,580.5	7,337.8	7,092.7	6,902.4	6,009.5	7,373.0	6,544.3
21	6,662.2	6,729.6	6,628.0	4,564.6	7,813.2	7,690.9	8,707.1	7,216.2	6,915.1	5,910.2	7,409.6	6,408.3
22	6,781.9	6,886.9	7,452.8	5,830.3	7,870.2	8,952.7	6,853.5	4,526.4	7,160.1	6,731.4	7,115.4	6,995.0
23	6,698.9	6,568.6	7,518.6	6,273.9	7,702.4	8,135.3	7,555.4	4,421.8	7,103.0	6,971.9	6,918.8	6,965.8
24	6,858.1	7,028.8	6,990.6	7,086.8	8,182.3	8,059.7	5,576.3	4,085.4	7,610.6	6,450.4	6,617.7	6,546.1
25	6,539.0	7,041.7	7,537.7	7,468.7	7,882.4	6,226.7	5,263.2	4,788.6	7,008.0	7,024.6	7,331.5	6,565.1
26	6,023.4	7,346.6	6,898.6	6,644.4	8,354.5	6,287.2	7,214.0	4,506.8	7,155.2	6,844.6	7,453.8	6,522.1
27	6,156.7	7,149.4	6,953.4	6,753.8	9,028.4	6,396.9	7,234.9	4,280.4	7,041.8	6,898.8	6,853.2	6,641.8
28	6,918.1	6,615.8	6,688.1	5,620.4	8,497.0	6,133.7	6,835.0	4,705.5	6,809.2	7,178.8	6,863.4	6,545.4
29	6,458.4	6,347.3	7,183.3	6,399.0	7,811.7	6,071.0	7,211.8	-	7,102.8	7,966.8	7,288.1	6,991.7
30	6,716.8	6,964.1	6,505.3	6,473.1	7,629.3	6,158.1	3,887.0	-	7,432.9	7,497.7	6,955.1	6,850.0
31	6,254.2	6,685.6	-	7,257.8	-	6,640.1	6,649.1	-	7,376.6	-	7,176.6	-
Total	**203,787**	**211,323**	**212,297**	**208,231**	**236,875**	**223,450**	**213,881**	**181,270**	**224,023**	**205,574**	**219,911**	**207,283**

Average	**6,574**	**6,817**	**7,077**	**6,717**	**7,896**	**7,208**	**6,899**	**6,474**	**7,227**	**6,852**	**7,094**	**6,909**
Large	**7,437**	**7,433**	**8,996**	**8,374**	**10,505**	**8,953**	**8,707**	**13,868**	**7,731**	**8,499**	**7,631**	**11,140**

Appendix C Application Depths for Condition 7

Appendix C.1 – Pivot 1 Average Daily Irrigation Applications in mm (Should be <20mm to Comply with Cor

Day	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-
1	5.20	6.19	5.94	5.70	5.38	5.35	5.40	5.59	5.6
2	5.49	6.21	6.02	5.69	5.33	5.49	5.40	0.00	0.0
3	5.89	6.22	5.91	5.65	5.24	5.47	5.34	0.00	5.6
4	5.86	6.16	5.94	5.59	5.09	5.36	5.38	0.00	5.5
5	5.90	6.21	5.91	5.63	5.25	5.19	5.49	0.00	5.6
6	6.04	6.16	5.80	5.48	5.31	5.38	5.27	0.00	5.6
7	5.85	6.14	5.87	5.61	5.32	5.29	5.30	0.00	5.6
8	6.30	6.11	5.69	5.50	5.30	5.40	5.45	0.00	5.5
9	6.44	6.16	5.92	5.52	5.21	5.36	5.37	0.00	5.6
10	6.30	6.01	5.81	5.50	5.23	5.28	5.38	0.00	5.5
11	6.27	5.99	5.97	5.51	5.29	0.00	5.45	0.00	5.4
12	6.24	6.11	5.90	5.38	5.29	0.00	5.48	0.00	5.5
13	6.27	6.06	5.79	5.50	0.00	5.26	5.36	0.00	5.5
14	6.25	6.01	5.83	5.39	0.00	5.30	5.35	0.00	5.7
15	6.55	6.02	5.23	5.51	0.00	5.31	5.39	0.00	5.6
16	6.32	6.05	5.74	5.54	0.00	5.28	5.38	5.51	0.0
17	6.30	6.01	5.77	5.41	0.00	5.30	5.39	0.00	5.7
18	6.72	5.97	5.70	5.42	0.00	5.38	5.21	0.00	5.6
19	6.38	6.04	5.58	5.42	5.44	5.32	5.33	0.00	5.6
20	6.32	6.04	5.59	5.42	5.31	5.41	5.35	5.60	5.7
21	6.31	6.02	5.67	5.46	5.36	5.40	5.10	5.63	0.0
22	6.54	6.01	5.70	5.27	5.42	5.11	5.29	5.57	5.8
23	6.25	5.97	5.74	5.43	5.46	5.10	5.47	6.28	5.6
24	6.19	6.01	5.71	5.42	5.58	5.17	5.54	9.36	5.7
25	6.20	6.03	5.80	5.41	5.30	5.38	5.58	6.23	5.7
26	6.17	6.05	5.71	5.41	5.32	5.32	5.54	5.79	5.7
27	6.21	6.06	5.75	5.50	5.35	0.00	5.48	5.60	5.7
28	6.20	6.05	5.75	5.48	5.42	5.46	5.55	6.00	5.7
29	6.23	6.13	5.65	5.45	5.37	5.62	5.49	0.00	0.0
30	6.19	6.02	5.79	5.38	5.41	5.41	5.37		5.6
31	6.21	6.02		5.31		5.50	5.52		5.6

Appendix C.2 – Pivot 2 Average Daily Irrigation Applications in mm (Should be <20mm to Comply with Condition 7)

Day	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
1	5.16	6.10	6.42	6.44	5.92	6.44	6.15	6.13	5.64	6.04	6.12	8.40
2	5.74	6.15	6.52	6.37	6.37	6.47	6.04	6.28	0.00	6.07	6.04	8.61
3	6.05	6.15	6.48	6.31	6.30	6.46	6.01	0.00	5.66	6.12	5.97	8.24
4	6.11	6.19	6.52	6.28	6.12	6.20	7.25	0.00	5.59	0.00	6.14	8.55
5	6.17	6.13	6.52	6.32	6.35	6.15	6.24	0.00	5.62	6.12	6.16	8.24
6	6.15	6.15	6.42	6.28	6.44	6.40	5.98	0.00	5.62	6.02	6.14	0.00
7	5.88	6.26	6.47	6.30	6.45	6.37	5.95	0.00	5.63	0.00	6.15	0.00
8	6.18	6.54	6.27	6.30	6.35	6.40	6.14	0.00	5.58	6.06	6.10	8.38
9	6.20	6.61	6.55	6.28	6.24	6.55	6.19	0.00	5.60	6.07	0.00	8.34
10	6.06	6.57	6.39	6.35	6.26	6.34	6.12	0.00	5.55	0.00	6.01	8.32
11	6.15	6.47	0.00	6.20	6.35	6.37	6.20	0.00	5.49	0.00	6.00	8.52
12	6.16	6.51	6.44	6.16	6.73	0.00	6.24	0.00	5.58	0.00	6.06	0.00
13	6.19	6.53	6.28	6.13	0.00	6.31	6.09	0.00	5.59	6.03	6.03	0.00
14	6.08	6.42	6.48	6.08	0.00	6.46	6.07	0.00	5.75	6.02	6.10	0.00
15	6.27	6.46	6.42	6.14	0.00	6.10	6.12	0.00	5.67	6.04	6.04	8.28
16	6.26	6.51	6.43	6.18	0.00	6.24	6.20	6.10	0.00	6.08	6.08	8.26
17	6.21	6.52	6.53	6.09	0.00	6.13	6.18	0.00	5.71	6.04	6.17	8.47
18	6.79	6.49	6.39	6.17	0.00	6.21	5.95	0.00	5.67	0.00	6.03	8.45
19	6.29	6.58	6.19	6.05	6.52	6.10	6.11	0.00	5.67	6.11	6.07	6.32
20	0.00	6.53	6.18	5.97	6.30	6.18	6.15	6.15	5.75	6.11	6.10	7.88
21	0.00	6.47	6.36	0.00	6.26	6.14	5.99	6.16	0.00	5.98	6.08	3.51
22	0.00	6.51	6.36	0.00	6.34	5.83	6.10	5.99	5.80	6.09	6.09	8.18
23	6.18	6.45	6.37	5.90	6.53	6.03	6.08	0.00	5.67	6.05	6.04	8.22
24	6.15	6.51	6.32	5.99	6.44	5.70	6.15	6.63	5.73	6.10	6.03	8.24
25	6.08	6.53	6.41	5.92	6.25	6.04	6.09	6.10	5.70	6.01	6.00	8.41
26	6.17	6.49	6.33	5.90	6.24	6.08	6.03	6.44	5.73	5.99	6.10	5.68
27	6.15	6.50	6.30	5.96	6.34	6.10	6.01	6.13	5.70	6.06	6.06	0.00
28	6.14	6.54	6.32	5.96	6.35	6.13	6.08	6.61	5.71	5.98	6.13	0.00
29	6.22	6.60	5.96	5.89	6.48	6.27	6.07	0.00	0.00	6.04	6.05	8.16
30	6.12	6.45	6.37	5.87	6.42	6.12	5.65		5.68	6.08	0.00	8.45
31	6.20	6.48		5.87		0.00	6.05		5.69		0.00	

Appendix C.3 – Pivot 3 Average Daily Irrigation Applications in mm (Should be <20mm to Comply with Condition 7)

Day	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
1	5.63	6.04	6.58	6.44	6.66	0.00	6.53	5.62	6.31	0.00	6.62	7.53
2	5.96	6.02	6.66	6.60	6.60	0.00	6.72	5.54	6.30	0.00	6.28	7.17
3	6.09	6.10	6.60	6.65	6.59	0.00	6.47	5.71	6.37	0.00	6.54	7.45
4	6.10	6.09	6.55	6.75	6.61	6.21	6.55	5.65	6.43	0.00	6.58	7.49
5	6.32	6.00	6.70	6.69	6.53	6.46	6.86	5.68	6.40	0.00	6.41	7.73
6	6.14	6.05	6.65	6.62	6.63	6.52	6.58	5.63	6.42	0.00	6.48	0.00
7	5.76	6.02	6.55	6.74	6.59	6.69	6.64	5.90	6.60	0.00	6.60	7.61
8	6.21	6.04	6.53	6.74	6.52	6.59	6.63	5.65	6.50	0.00	6.38	7.41
9	6.06	6.08	6.61	6.69	6.41	6.56	6.65	5.50	6.33	0.00	7.08	7.59
10	6.43	6.07	6.51	6.65	6.41	6.49	6.62	5.57	6.43	0.00	6.54	7.66
11	6.05	6.00	6.56	6.68	6.58	6.58	6.51	5.59	6.25	0.00	6.37	7.56
12	6.08	5.97	6.54	6.57	6.57	6.49	6.49	5.58	6.34	6.52	6.37	0.00
13	6.56	6.05	6.50	6.72	6.73	6.52	6.52	5.67	6.36	6.34	6.53	0.00
14	6.32	5.89	6.63	6.72	6.72	0.00	6.60	5.75	6.29	6.30	6.50	7.56
15	6.02	5.93	6.57	6.63	0.00	6.62	6.58	5.83	6.36	6.50	6.27	7.38
16	6.28	5.81	6.56	6.66	0.00	6.61	6.66	6.46	0.00	6.52	6.57	7.54
17	6.02	5.92	6.56	6.73	0.00	6.51	6.55	6.34	0.00	6.12	6.57	7.60
18	5.99	5.92	6.49	6.66	0.00	6.55	6.53	6.41	0.00	0.00	6.35	7.49
19	6.10	6.14	6.65	6.48	8.20	6.59	6.62	6.40	0.00	6.48	6.34	10.73
20	6.00	6.04	6.41	6.53	0.00	6.58	6.40	6.54	0.00	6.36	6.54	6.90
21	5.92	5.97	6.63	6.63	0.00	6.62	6.50	0.00	0.00	6.48	6.48	9.08
22	5.96	5.99	6.60	6.47	0.00	6.42	6.46	0.00	0.00	6.54	6.45	7.55
23	6.24	6.33	6.47	6.69	0.00	6.53	6.47	6.82	0.00	6.64	6.70	7.51
24	6.10	6.62	6.46	6.82	0.00	6.30	6.45	6.34	0.00	6.67	6.41	7.69
25	6.03	6.57	6.52	6.65	0.00	6.35	6.62	6.46	0.00	6.29	6.35	7.77
26	6.13	6.61	6.63	6.61	0.00	6.36	6.58	6.91	0.00	6.50	6.39	8.10
27	5.99	6.55	6.56	6.67	0.00	6.30	6.46	6.91	0.00	6.28	6.44	0.00
28	6.03	6.69	6.51	6.94	0.00	6.47	6.67	6.46	0.00	6.24	6.56	0.00
29	5.95	6.51	6.40	6.73	0.00	6.40	6.61	0.00	0.00	6.33	6.81	0.00
30	6.08	6.64	6.39	6.49	0.00	6.54	8.70		0.00	6.54	0.00	0.00
31	6.07	6.68		6.67		6.79	5.86		0.00		0.00	

Appendix C.4 – Pivot 4 Average Daily Irrigation Applications in mm (Should be <20mm to Comply with Condition 7)

Day	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
1	6.57	6.83	7.35	7.44	7.84	7.70	0.00	7.91	7.52	7.33	7.53	7.74
2	6.74	6.74	7.45	7.64	7.72	7.75	0.00	7.59	7.66	7.59	7.06	7.80
3	6.95	6.65	7.48	7.93	7.67	7.68	0.00	7.71	7.48	7.63	7.30	7.61
4	6.93	6.78	7.42	7.96	7.58	7.50	0.00	7.71	7.77	7.42	7.44	7.73
5	6.89	6.77	7.48	8.06	7.52	7.50	0.00	7.72	7.74	7.40	7.25	7.69
6	6.89	6.80	7.34	7.89	7.60	7.37	0.00	7.79	7.73	7.47	7.24	7.80
7	6.26	6.77	7.46	7.99	7.49	7.65	0.00	8.30	7.73	0.00	7.46	7.79
8	7.38	7.43	7.31	7.95	7.41	7.69	0.00	8.04	7.47	7.39	7.28	8.07
9	6.94	7.72	7.40	7.79	7.34	7.59	0.00	8.13	0.00	7.51	7.33	8.20
10	7.03	7.61	7.36	7.97	7.39	7.54	0.00	0.00	0.00	0.00	7.29	8.22
11	6.74	7.73	7.44	7.94	7.58	7.54	7.52	8.03	0.00	7.47	7.18	8.06
12	6.85	7.64	7.42	0.00	7.53	7.45	7.48	8.09	0.00	7.38	7.20	0.00
13	6.97	7.47	7.40	7.73	7.74	7.48	7.45	8.15	0.00	7.49	7.22	8.00
14	7.09	7.56	7.49	8.01	7.57	0.00	7.40	8.61	0.00	7.41	0.00	7.94
15	6.71	7.69	7.28	7.88	7.38	7.46	7.64	0.00	7.70	7.56	0.00	8.15
16	7.00	7.54	7.21	8.01	7.58	7.45	7.63	7.61	7.55	7.51	0.00	8.07
17	6.83	7.50	7.57	7.89	7.51	7.35	7.63	7.87	7.61	0.00	0.00	8.07
18	6.39	7.57	7.79	8.08	7.49	7.60	7.58	7.81	7.78	7.27	0.00	8.29
19	7.26	7.50	7.59	7.84	7.55	0.00	7.76	7.82	7.54	7.33	0.00	9.73
20	6.84	7.65	7.33	7.83	7.08	0.00	7.58	7.95	7.86	7.48	0.00	7.88
21	6.76	7.60	7.50	7.81	7.48	0.00	7.59	10.43	7.55	7.48	0.00	9.51
22	6.79	7.58	7.57	7.77	7.45	7.16	7.63	8.25	7.76	7.47	0.00	7.84
23	7.02	7.43	7.48	8.13	7.61	7.50	7.74	7.55	7.40	7.31	0.00	7.98
24	6.84	7.54	7.34	8.07	7.49	7.22	7.44	8.17	7.25	7.30	0.00	7.98
25	6.80	7.54	7.50	7.87	7.60	0.00	7.71	8.36	7.56	7.39	0.00	8.63
26	6.84	7.48	7.56	7.71	7.55	0.00	7.67	7.79	0.00	7.39	0.00	6.91
27	6.74	7.58	7.44	7.72	7.64	0.00	7.60	7.90	0.00	7.25	0.00	8.12
28	6.87	7.49	7.43	7.73	0.00	0.00	7.69	8.43	7.42	7.10	0.00	8.02
29	6.75	7.60	7.45	0.00	0.00	0.00	7.79	0.00	7.54	7.17	0.00	8.09
30	6.86	7.57	7.50	7.64	7.75	0.00	11.54		7.18	7.43	0.00	7.86
31	6.87	7.41		7.39		0.00	7.65		7.29		0.00	

Appendix C.5 – Pivot 5 Average Daily Irrigation Applications in mm (Should be <20mm to Comply with Condition 7)

Day	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
1	6.15	6.75	6.22	0.00	2.13	7.64	7.12	7.49	7.53	7.42	7.48	7.67
2	6.59	6.52	6.19	0.00	2.08	7.55	7.36	7.36	7.55	7.54	7.39	6.79
3	6.80	0.00	6.12	0.00	2.06	7.43	7.27	7.46	5.60	7.37	7.49	7.65
4	6.64	6.66	6.07	0.00	2.14	7.50	7.46	7.33	7.61	7.45	7.38	7.63
5	6.72	6.57	6.30	0.00	2.31	7.61	7.43	7.55	6.47	7.35	7.54	7.82
6	6.95	6.59	6.11	0.00	0.00	0.00	7.06	7.85	7.64	7.36	7.39	7.73
7	7.51	6.50	6.16	0.00	0.00	6.91	7.30	7.38	7.62	0.00	7.37	7.71
8	6.90	6.60	5.82	0.00	0.00	0.00	7.48	7.37	7.70	7.38	7.33	7.73
9	6.74	6.57	6.21	5.33	1.63	0.00	7.37	7.22	0.00	7.44	7.32	7.71
10	6.76	6.63	6.13	0.00	1.62	0.00	7.58	7.69	0.00	7.42	7.39	7.55
11	6.83	6.53	6.11	0.00	1.61	0.00	7.11	7.50	0.00	7.39	7.51	7.80
12	6.68	6.56	6.14	0.00	1.61	7.48	7.51	7.75	0.00	7.51	7.37	7.78
13	6.74	6.37	6.17	0.00	2.14	0.00	7.28	7.59	0.00	7.51	7.39	7.76
14	6.70	6.32	6.33	0.00	2.09	0.00	7.35	7.49	0.00	7.50	7.72	7.66
15	6.59	6.33	6.15	0.00	2.11	0.00	7.39	7.52	7.38	7.48	7.61	7.61
16	6.59	6.29	6.30	0.00	2.10	0.00	7.46	7.55	7.55	7.60	7.66	7.74
17	6.58	6.33	6.18	0.00	2.16	0.00	7.51	7.58	7.23	7.48	7.72	7.74
18	6.78	0.00	6.16	3.49	2.07	7.43	7.33	7.48	7.47	7.38	7.68	6.86
19	6.99	6.26	6.08	2.95	2.12	7.39	7.33	7.47	7.54	7.40	7.66	7.20
20	6.65	6.28	5.95	3.01	2.02	7.49	7.40	7.77	7.58	7.61	7.73	7.44
21	6.72	6.29	6.08	2.97	2.05	7.44	7.38	0.00	7.44	7.62	7.71	7.47
22	6.64	6.20	6.01	3.09	3.99	7.24	7.42	0.00	7.41	7.58	7.66	7.71
23	6.68	6.22	6.08	3.02	7.58	7.40	7.47	0.00	7.50	7.51	7.72	7.74
24	6.74	6.27	6.15	3.03	7.56	7.06	7.27	0.00	7.56	7.56	7.76	7.80
25	6.59	6.26	6.15	2.95	7.67	7.30	7.97	0.00	7.57	7.42	7.73	8.47
26	6.96	6.31	0.00	2.52	7.43	7.36	7.59	0.00	7.51	7.46	7.76	7.54
27	6.58	6.32	0.00	2.28	7.28	7.55	7.39	7.26	7.37	7.44	7.79	7.67
28	6.64	6.28	0.00	2.28	7.50	7.43	7.39	7.66	7.41	7.41	7.84	7.39
29	6.56	6.17	6.07	2.28	7.48	7.52	7.39	0.00	7.41	7.40	7.65	7.76
30	6.68	6.30	0.00	2.32	7.54	7.55	7.57		7.33	7.53	7.78	7.83
31	6.62	6.36		2.94		7.57	7.29		7.48		7.84	

Appendix C.6 – Pivot 6 Average Daily Irrigation Applications in mm (Should be <20mm to Comply with Condition 7)

Day	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
1	6.27	0.00	0.00	0.00	0.00	0.00	7.74	7.81	8.13	7.94	0.00	7.64
2	6.73	0.00	0.00	0.00	0.00	8.37	7.87	7.86	0.00	7.75	0.00	8.11
3	6.75	0.00	0.00	0.00	0.00	8.06	7.28	7.91	0.00	7.73	0.00	8.13
4	6.66	0.00	0.00	0.00	3.81	7.87	7.83	7.84	0.00	7.77	0.00	7.73
5	6.53	0.00	0.00	13.11	3.85	7.46	7.88	8.14	0.00	7.75	0.00	7.77
6	6.52	0.00	0.00	0.00	0.00	7.89	7.55	7.79	0.00	7.71	0.00	7.74
7	5.79	0.00	0.00	0.00	0.00	7.79	7.47	7.85	0.00	7.57	0.00	7.98
8	6.50	0.00	0.00	8.98	3.75	7.84	7.90	7.84	8.04	7.74	0.00	7.81
9	6.52	0.00	0.00	0.00	0.00	7.93	7.79	7.88	7.79	7.71	0.00	7.70
10	6.64	0.00	0.00	0.00	2.97	7.56	7.72	7.94	7.83	7.71	0.00	7.66
11	6.38	0.00	0.00	0.00	2.98	7.71	7.84	7.92	7.67	7.68	0.00	7.79
12	6.87	0.00	0.00	0.00	2.99	7.87	8.05	8.06	7.84	7.75	0.00	7.72
13	6.59	0.00	0.00	0.00	3.80	7.76	7.82	7.76	7.77	7.83	0.00	7.76
14	6.71	0.00	0.00	0.00	3.75	7.75	7.74	7.78	7.92	7.73	0.00	8.00
15	6.55	0.00	0.00	0.00	3.73	7.77	7.80	7.91	7.82	7.79	0.00	7.78
16	6.55	0.00	0.00	0.00	3.75	7.72	7.98	7.82	7.80	7.72	0.00	7.79
17	6.50	0.00	0.00	0.00	3.77	7.78	7.79	7.96	7.98	7.71	0.00	7.79
18	6.24	0.00	0.00	0.00	3.74	7.81	7.76	7.78	8.04	7.73	0.00	7.70
19	6.99	0.00	0.00	0.00	3.74	7.80	7.81	7.85	7.90	0.00	0.00	7.45
20	6.49	0.00	0.00	0.00	3.63	7.65	7.74	7.89	7.87	0.00	0.00	7.28
21	6.90	0.00	0.00	0.00	3.70	7.95	7.79	7.84	7.77	0.00	0.00	7.56
22	6.65	0.00	0.00	0.00	5.01	7.74	7.80	7.80	7.84	0.00	0.00	7.72
23	6.62	0.00	0.00	9.83	8.02	7.69	7.78	8.43	7.66	0.00	0.00	7.58
24	0.00	0.00	0.00	6.11	7.83	7.04	7.77	8.35	7.81	0.00	0.00	7.77
25	0.00	0.00	0.00	7.44	7.42	7.75	7.96	7.88	7.80	0.00	0.00	7.58
26	0.00	0.00	0.00	7.90	7.69	7.72	7.90	7.84	7.76	0.00	0.00	7.49
27	0.00	0.00	0.00	8.64	7.86	7.93	7.89	7.94	7.86	0.00	0.00	7.63
28	0.00	0.00	0.00	8.28	7.83	7.94	7.84	7.89	8.00	0.00	0.00	7.72
29	0.00	0.00	0.00	7.18	7.96	7.93	7.84	0.00	7.86	0.00	0.00	7.71
30	0.00	0.00	0.00	6.89	7.81	8.08	8.47		7.89	0.00	7.81	7.90
31	0.00	0.00		7.75		8.11	7.85		7.97		7.81	

Appendix C.7 – Pivot 7 Average Daily Irrigation Applications in mm (Should be <20mm to Comply with Condition 7)

1	0.00	7.00	10.27	10.07	8.93	8.54	7.66	5.43	10.13	10.73	9.63	10.54
2	0.00	5.90	8.87	9.07	5.44	9.91	8.92	5.40	10.79	5.75	5.89	4.85
3	9.52	6.80	8.05	9.97	4.79	9.16	7.73	10.82	10.75	5.81	8.72	13.19
4	13.12	7.78	6.91	9.19	5.56	5.14	10.89	10.84	7.51	6.70	7.97	7.38
5	7.67	7.03	8.06	9.93	9.69	9.45	10.82	11.01	10.08	8.44	10.58	2.74
6	5.40	8.65	5.58	9.63	5.25	9.83	10.30	8.15	10.77	7.73	9.71	1.14
7	9.24	7.79	8.68	9.99	4.87	5.81	10.90	8.76	7.61	10.31	9.34	3.47
8	8.76	8.39	7.04	5.13	4.79	8.22	11.04	7.12	5.83	7.61	10.40	6.56
9	5.94	8.11	10.31	9.89	8.80	8.41	5.95	10.75	8.28	7.76	10.45	4.71
10	7.77	9.29	8.05	9.73	8.90	8.39	5.71	10.85	9.91	10.47	10.46	5.46
11	5.89	9.92	9.06	9.77	4.95	10.01	7.41	10.70	7.72	6.96	10.51	6.53
12	7.73	6.93	8.62	9.68	9.80	9.90	0.00	10.66	5.65	8.00	10.53	6.45
13	7.82	9.22	10.08	9.74	7.89	9.83	0.00	10.69	5.41	7.37	5.98	1.95
14	4.92	6.02	7.37	9.16	8.16	9.79	0.00	7.77	7.53	10.72	10.05	0.00
15	9.67	8.81	10.12	4.82	8.96	7.57	0.00	5.29	9.88	6.99	5.27	3.18
16	5.58	8.01	8.12	9.46	9.65	6.10	0.00	5.32	10.69	8.49	8.42	0.19
17	8.74	7.98	10.34	8.59	9.07	9.65	0.00	10.69	10.68	7.42	6.92	8.40
18	8.50	9.85	10.18	6.30	9.41	9.99	0.00	10.83	7.40	10.54	8.77	8.22
19	7.13	6.74	7.79	9.76	7.62	9.98	0.00	10.45	9.04	6.68	8.29	4.19
20	7.63	9.61	10.06	4.95	9.68	9.58	0.00	9.91	10.73	9.67	6.82	2.32
21	7.51	6.90	9.90	6.20	6.69	9.58	0.00	8.84	7.98	6.50	8.05	2.07
22	6.01	10.59	5.51	8.01	4.90	9.12	0.00	10.69	5.30	10.42	9.11	6.91
23	7.83	5.93	10.13	9.44	8.97	6.28	0.00	10.49	10.55	10.69	8.18	2.23
24	6.14	9.14	10.10	0.00	9.21	9.63	0.00	10.73	10.63	7.07	9.17	7.95
25	7.09	8.37	5.51	0.00	8.38	9.41	0.00	7.22	8.44	8.94	8.51	7.37
26	6.48	8.48	7.46	0.00	9.58	9.91	0.00	7.11	10.13	8.68	9.73	3.58
27	7.45	10.56	4.81	0.00	9.82	10.17	0.00	6.95	6.05	10.59	10.38	1.76
28	7.38	10.28	7.88	0.00	8.51	9.68	0.00	10.72	10.72	9.52	10.26	2.25
29	6.05	6.61	9.13	8.24	6.72	8.55	0.00	0.00	10.80	9.83	8.95	4.82
30	8.02	8.67	10.11	7.22	8.60	7.09	0.00		8.87	6.89	9.05	4.40
31	8.38	7.53		7.81		7.23	0.00		10.77		8.17	

Appendix C.8 –Pivot 1 Consecutive 5-Day Application Depths in mm (Should be <64 mm to Comply with Condition 7)

Day	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
1												
2												
3												
4												
5	28.33	30.99	29.73	28.26	26.29	26.86	27.01	5.59	22.50	22.43	30.28	30.47
6	29.17	30.96	29.59	28.04	26.22	26.90	26.88	0.00	22.48	22.39	31.00	24.29
7	29.54	30.89	29.43	27.95	26.21	26.70	26.78	0.00	28.11	16.78	31.79	18.03
8	29.95	30.78	29.21	27.80	26.27	26.63	26.89	0.00	28.04	16.79	31.91	17.64
9	30.53	30.77	29.19	27.73	26.39	26.63	26.88	0.00	28.05	22.36	31.85	17.69
10	30.93	30.57	29.08	27.60	26.37	26.72	26.77	0.00	27.99	16.78	31.91	18.43
11	31.16	30.40	29.26	27.63	26.35	21.33	26.95	0.00	27.86	11.21	32.28	24.69
12	31.55	30.37	29.30	27.41	26.33	16.04	27.13	0.00	27.81	11.21	32.19	31.00
13	31.53	30.32	29.39	27.41	21.03	15.91	27.04	0.00	27.81	11.57	32.05	25.09
14	31.33	30.17	29.31	27.28	15.81	15.84	27.03	0.00	27.96	11.50	32.04	18.82
15	31.58	30.19	28.73	27.29	10.58	15.87	27.04	0.00	28.08	17.02	31.90	12.57
16	31.63	30.26	28.50	27.32	5.29	21.15	26.96	5.51	22.59	22.57	31.53	12.63
17	31.69	30.16	28.36	27.35	0.00	26.45	26.87	5.51	22.72	22.57	31.50	12.59
18	32.14	30.07	28.27	27.27	0.00	26.57	26.72	5.51	22.80	22.23	31.56	18.87
19	32.27	30.09	28.02	27.31	5.44	26.60	26.70	5.51	22.72	22.28	31.51	32.04
20	32.04	30.11	28.38	27.22	10.74	26.70	26.65	11.11	22.80	16.76	31.58	38.22
21	32.03	30.08	28.31	27.14	16.11	26.81	26.37	11.23	22.80	16.76	31.60	37.43
22	32.26	30.08	28.24	27.00	21.53	26.62	26.28	16.80	22.89	22.23	31.65	31.16
23	31.80	30.07	28.28	27.01	26.99	26.35	26.53	23.08	22.89	22.07	31.64	31.14
24	31.60	30.04	28.41	27.01	27.13	26.20	26.75	32.44	22.94	22.00	31.78	24.30
25	31.49	30.03	28.61	27.00	27.13	26.17	26.98	33.07	22.90	27.51	31.73	24.52
26	31.35	30.06	28.65	26.94	27.08	26.09	27.42	33.24	28.63	27.46	31.69	23.00
27	31.03	30.11	28.70	27.18	27.00	20.97	27.61	33.27	28.53	27.86	31.68	23.00
28	30.98	30.20	28.72	27.22	26.97	21.33	27.70	32.99	28.57	27.85	31.70	23.20
29	31.02	30.33	28.65	27.25	26.76	21.78	27.64	23.63	22.84	27.83	31.57	23.26
30	31.00	30.32	28.64	27.22	26.86	21.81	27.43	17.40	22.82	27.86	31.73	23.34
31	31.04	30.29	22.93	27.13	21.55	21.99	27.41	11.61	22.77	22.36	31.81	19.33

Appendix C.9 –Pivot 2 Consecutive 5-Day Application Depths in mm (Should be <64 mm to Comply with Condition 7)

Day	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
1												
2												
3												
4												
5	29.23	30.72	32.46	31.72	31.06	31.72	31.68	12.41	22.50	24.35	30.42	42.04
6	30.22	30.76	32.45	31.56	31.58	31.69	31.52	6.28	22.48	24.33	30.44	33.64
7	30.35	30.87	32.40	31.50	31.66	31.58	31.42	0.00	28.11	18.25	30.56	25.02
8	30.49	31.26	32.19	31.49	31.71	31.52	31.55	0.00	28.04	18.20	30.69	25.16
9	30.58	31.69	32.23	31.49	31.83	31.87	30.49	0.00	28.05	24.26	24.55	24.95
10	30.46	32.14	32.10	31.52	31.74	32.06	30.37	0.00	27.99	18.15	24.40	25.03
11	30.46	32.46	25.69	31.44	31.65	32.02	30.59	0.00	27.86	12.13	24.27	33.55
12	30.74	32.71	25.66	31.30	31.94	25.65	30.88	0.00	27.81	12.13	24.17	33.55
13	30.75	32.69	25.66	31.12	25.59	25.56	30.83	0.00	27.81	12.10	24.10	25.17
14	30.63	32.49	25.59	30.93	19.34	25.47	30.71	0.00	27.96	12.05	30.19	16.83
15	30.85	32.39	25.62	30.72	13.08	25.23	30.71	0.00	28.08	18.09	30.22	16.80
16	30.96	32.43	32.05	30.70	6.73	25.11	30.71	6.10	22.59	24.17	30.30	16.54
17	31.01	32.44	32.15	30.62	0.00	31.24	30.66	6.10	22.72	30.21	30.42	25.01
18	31.61	32.40	32.25	30.66	0.00	31.15	30.52	6.10	22.80	24.18	30.42	33.46
19	31.82	32.56	31.96	30.63	6.52	30.79	30.56	6.10	22.72	24.28	30.39	39.78
20	25.55	32.63	31.72	30.45	12.82	30.87	30.60	12.24	22.80	24.35	30.45	39.38
21	19.29	32.59	31.65	24.27	19.08	30.76	30.38	12.31	22.80	24.25	30.45	34.63
22	13.08	32.57	31.48	18.19	25.42	30.47	30.30	18.30	22.89	24.30	30.36	34.34
23	12.47	32.53	31.46	17.91	31.96	30.28	30.43	18.30	22.89	30.35	30.37	34.11
24	12.32	32.46	31.59	17.86	31.88	29.88	30.47	24.93	22.94	30.33	30.33	36.04
25	18.41	32.46	31.83	17.81	31.83	29.74	30.41	24.89	22.90	30.24	30.23	36.56
26	24.57	32.49	31.80	23.71	31.81	29.69	30.45	25.16	28.63	30.25	30.26	38.73
27	30.73	32.48	31.74	29.67	31.81	29.95	30.36	25.30	28.53	30.22	30.23	30.55
28	30.69	32.57	31.69	29.73	31.63	30.05	30.36	31.91	28.57	30.15	30.32	22.33
29	30.76	32.66	31.34	29.63	31.67	30.63	30.28	25.28	22.84	30.09	30.34	22.25
30	30.80	32.57	31.29	29.58	31.84	30.70	29.84	19.17	22.82	30.16	24.34	22.29
31	30.83	32.57	24.96	29.54	25.59	24.62	29.86	12.74	22.77	24.16	18.24	16.61

Appendix C.10 –Pivot 3 Consecutive 5-Day Application Depths in mm (Should be <64 mm to Comply with Condition 7)

Day	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
1												
2												
3												
4												
5	30.10	30.25	33.09	33.13	32.99	12.67	33.14	28.20	31.81	0.00	32.42	37.37
6	30.61	30.26	33.15	33.31	32.96	19.19	33.18	28.21	31.91	0.00	32.28	29.84
7	30.41	30.26	33.04	33.46	32.95	25.88	33.10	28.57	32.21	0.00	32.60	30.27
8	30.54	30.20	32.97	33.54	32.88	32.48	33.26	28.51	32.35	0.00	32.44	30.23
9	30.50	30.19	33.03	33.47	32.67	32.82	33.36	28.36	32.24	0.00	32.94	30.33
10	30.61	30.26	32.84	33.44	32.55	32.85	33.11	28.25	32.27	0.00	33.07	30.26
11	30.52	30.21	32.75	33.50	32.51	32.92	33.04	28.21	32.10	0.00	32.96	37.83
12	30.84	30.16	32.74	33.33	32.48	32.71	32.89	27.89	31.85	6.52	32.74	30.22
13	31.18	30.17	32.71	33.31	32.69	32.64	32.79	27.91	31.71	12.86	32.89	22.82
14	31.44	29.98	32.73	33.35	33.01	26.08	32.74	28.16	31.67	19.16	32.31	22.79
15	31.03	29.85	32.80	33.33	26.60	26.21	32.69	28.42	31.61	25.66	32.04	22.51
16	31.26	29.65	32.80	33.31	20.02	26.23	32.85	29.29	25.35	32.17	32.24	22.48
17	31.20	29.60	32.82	33.47	13.45	26.26	32.91	30.06	19.01	31.77	32.44	30.08
18	30.64	29.47	32.82	33.41	6.72	26.29	32.92	30.80	12.65	25.44	32.26	37.57
19	30.41	29.72	32.83	33.16	8.20	32.88	32.94	31.45	6.36	25.61	32.11	40.74
20	30.39	29.83	32.67	33.07	8.20	32.83	32.77	32.15	0.00	25.47	32.37	40.25
21	30.03	29.99	32.74	33.04	8.20	32.85	32.60	25.69	0.00	25.43	32.28	41.79
22	29.97	30.06	32.78	32.78	8.20	32.76	32.50	19.35	0.00	25.86	32.16	41.74
23	30.22	30.48	32.76	32.80	8.20	32.73	32.44	19.76	0.00	32.50	32.51	41.76
24	30.22	30.95	32.57	33.15	0.00	32.44	32.27	19.69	0.00	32.69	32.58	38.72
25	30.26	31.48	32.67	33.27	0.00	32.21	32.50	19.61	0.00	32.63	32.40	39.59
26	30.47	32.12	32.68	33.25	0.00	31.96	32.58	26.52	0.00	32.65	32.31	38.62
27	30.50	32.68	32.63	33.45	0.00	31.83	32.58	33.43	0.00	32.39	32.29	31.07
28	30.29	33.04	32.67	33.70	0.00	31.77	32.77	33.08	0.00	31.98	32.16	23.56
29	30.14	32.93	32.62	33.61	0.00	31.87	32.94	26.74	0.00	31.64	32.55	15.88
30	30.19	33.00	32.49	33.45	0.00	32.06	35.02	20.28	0.00	31.88	26.20	8.10
31	30.13	33.07	25.86	33.51	0.00	32.49	34.31	13.37	0.00	25.39	19.81	0.00

Appendix C.11 –Pivot 4 Consecutive 5-Day Application Depths in mm (Should be <64 mm to Comply with Condition 7)

Day	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
1												
2												
3												
4												
5	34.08	33.78	37.18	39.03	38.32	38.13	0.00	38.63	38.18	37.37	36.58	38.58
6	34.40	33.74	37.16	39.48	38.08	37.80	0.00	38.51	38.39	37.51	36.29	38.63
7	33.93	33.78	37.17	39.83	37.86	37.71	0.00	39.22	38.46	29.92	36.69	38.61
8	34.35	34.55	37.01	39.85	37.61	37.72	0.00	39.56	38.45	29.68	36.67	39.07
9	34.36	35.49	36.99	39.68	37.37	37.81	0.00	39.98	30.67	29.77	36.56	39.54
10	34.50	36.33	36.88	39.59	37.24	37.84	0.00	32.26	22.93	22.37	36.60	40.06
11	34.35	37.26	36.98	39.64	37.22	38.01	7.52	32.51	15.20	22.38	36.54	40.33
12	34.94	38.14	36.93	31.65	37.26	37.81	15.01	32.30	7.47	29.76	36.28	32.54
13	34.53	38.18	37.02	31.43	37.59	37.60	22.46	32.41	0.00	29.85	36.22	32.48
14	34.68	38.02	37.10	31.65	37.82	30.01	29.86	32.88	0.00	29.75	28.89	32.22
15	34.36	38.10	37.02	31.57	37.81	29.94	37.50	32.88	7.70	37.31	21.60	32.15
16	34.62	37.91	36.79	31.64	37.81	29.84	37.60	32.45	15.25	37.34	14.42	32.16
17	34.60	37.77	36.95	39.53	37.79	29.74	37.74	32.23	22.86	29.96	7.22	40.23
18	34.02	37.86	37.34	39.88	37.53	29.86	37.87	31.89	30.64	29.75	0.00	40.52
19	34.19	37.80	37.44	39.71	37.51	29.86	38.22	31.10	38.18	29.67	0.00	42.32
20	34.33	37.76	37.50	39.66	37.22	22.40	38.17	39.05	38.35	29.59	0.00	42.04
21	34.09	37.82	37.79	39.46	37.11	14.95	38.13	41.87	38.34	29.56	0.00	43.49
22	34.04	37.90	37.79	39.34	37.05	14.76	38.13	42.25	38.49	37.04	0.00	43.26
23	34.67	37.76	37.48	39.39	37.16	14.67	38.30	41.99	38.11	37.07	0.00	42.95
24	34.25	37.80	37.23	39.62	37.10	21.89	37.99	42.34	37.81	37.04	0.00	41.20
25	34.20	37.69	37.39	39.66	37.62	21.89	38.12	42.74	37.52	36.95	0.00	41.95
26	34.28	37.57	37.45	39.56	37.69	21.89	38.20	40.11	29.96	36.85	0.00	39.34
27	34.24	37.57	37.32	39.51	37.89	14.72	38.17	39.76	22.21	36.62	0.00	39.62
28	34.10	37.64	37.27	39.10	30.28	7.22	38.12	40.64	22.23	36.42	0.00	39.67
29	34.01	37.69	37.37	31.04	22.80	0.00	38.46	32.48	22.53	36.30	0.00	39.77
30	34.07	37.72	37.38	30.80	22.94	0.00	42.29	24.12	22.15	36.34	0.00	39.00
31	34.10	37.65	29.82	30.48	15.39	0.00	42.27	16.33	29.44	28.96	0.00	32.10

Appendix C.12 –Pivot 5 Consecutive 5-Day Application Depths in mm (Should be <64 mm to Comply with Condition 7)

Day	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
1												
2												
3												
4												
5	32.91	26.50	30.91	0.00	10.73	37.74	36.65	37.19	34.76	37.12	37.28	37.57
6	33.71	26.34	30.79	0.00	8.60	30.10	36.58	37.55	34.87	37.07	37.18	37.62
7	34.64	26.32	30.76	0.00	6.52	29.46	36.52	37.56	34.94	29.53	37.16	38.55
8	34.73	32.92	30.46	0.00	4.46	22.03	36.72	37.47	37.04	29.53	37.01	38.63
9	34.83	32.83	30.60	5.33	3.94	14.52	36.63	37.36	29.43	29.53	36.96	38.71
10	34.87	32.89	30.43	5.33	3.25	6.91	36.78	37.50	22.96	29.60	36.81	38.44
11	34.74	32.83	30.43	5.33	4.86	6.91	36.83	37.16	15.32	29.63	36.92	38.51
12	33.91	32.89	30.42	5.33	6.47	7.48	37.05	37.54	7.70	37.14	36.93	38.58
13	33.75	32.66	30.77	5.33	8.61	7.48	36.85	37.76	0.00	37.27	36.98	38.61
14	33.72	32.42	30.89	0.00	9.06	7.48	36.84	38.03	0.00	37.33	37.38	38.55
15	33.55	32.11	30.91	0.00	9.55	7.48	36.65	37.86	7.38	37.38	37.60	38.61
16	33.31	31.87	31.10	0.00	10.04	7.48	36.99	37.91	14.92	37.60	37.75	38.55
17	33.21	31.64	31.13	0.00	10.59	0.00	36.98	37.74	22.15	37.57	38.10	38.51
18	33.25	25.27	31.12	3.49	10.52	7.43	37.03	37.63	29.62	37.45	38.39	37.60
19	33.53	25.21	30.86	6.45	10.56	14.82	37.02	37.61	37.16	37.35	38.33	37.14
20	33.59	25.16	30.66	9.46	10.48	22.31	37.04	37.86	37.37	37.48	38.45	36.98
21	33.72	25.16	30.44	12.42	10.43	29.75	36.96	30.31	37.26	37.50	38.50	36.71
22	33.78	25.03	30.27	15.51	12.26	36.99	36.87	22.73	37.45	37.59	38.43	36.68
23	33.68	31.25	30.19	15.04	17.77	36.95	37.01	15.24	37.48	37.72	38.48	37.57
24	33.43	31.26	30.26	15.11	23.20	36.62	36.94	7.77	37.49	37.88	38.58	38.17
25	33.37	31.24	30.46	15.05	28.85	36.44	37.51	0.00	37.48	37.69	38.58	39.19
26	33.62	31.26	24.39	14.61	34.22	36.36	37.72	0.00	37.55	37.53	38.63	39.26
27	33.55	31.38	18.38	13.80	37.51	36.67	37.69	7.26	37.52	37.39	38.76	39.21
28	33.51	31.44	12.30	13.06	37.43	36.71	37.61	14.92	37.42	37.29	38.87	38.86
29	33.33	31.35	12.23	12.32	37.36	37.17	37.74	14.92	37.27	37.13	38.76	38.83
30	33.42	31.39	6.07	11.69	37.22	37.41	37.34	14.92	37.03	37.24	38.81	38.19
31	33.07	31.43	6.07	12.11	29.79	37.62	37.04	14.92	37.01	29.78	38.89	30.66

Appendix C.13 –Pivot 6 Consecutive 5-Day Application Depths in mm (Should be <64 mm to Comply with Condition 7)

Day	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
1												
2												
3												
4												
5	32.95	0.00	0.00	13.11	7.66	31.76	38.60	39.57	8.13	38.93	0.00	39.37
6	33.19	0.00	0.00	13.11	7.66	39.65	38.41	39.55	0.00	38.70	0.00	39.47
7	32.24	0.00	0.00	13.11	7.66	39.07	38.02	39.53	0.00	38.53	0.00	39.35
8	32.00	0.00	0.00	22.09	11.41	38.85	38.63	39.46	8.04	38.54	0.00	39.03
9	31.85	0.00	0.00	22.09	7.61	38.92	38.58	39.49	15.83	38.48	0.00	39.00
10	31.96	0.00	0.00	8.98	6.72	39.01	38.42	39.30	23.66	38.44	0.00	38.89
11	31.82	0.00	0.00	8.98	9.70	38.84	38.71	39.43	31.33	38.40	0.00	38.94
12	32.91	0.00	0.00	8.98	12.70	38.91	39.30	39.64	39.18	38.58	0.00	38.68
13	33.00	0.00	0.00	0.00	12.75	38.83	39.22	39.56	38.90	38.67	0.00	38.63
14	33.20	0.00	0.00	0.00	16.50	38.64	39.17	39.46	39.03	38.69	0.00	38.93
15	33.10	0.00	0.00	0.00	17.26	38.85	39.25	39.43	39.02	38.78	0.00	39.05
16	33.28	0.00	0.00	0.00	18.03	38.86	39.40	39.33	39.15	38.82	0.00	39.05
17	32.91	0.00	0.00	0.00	18.81	38.77	39.14	39.23	39.29	38.77	0.00	39.12
18	32.56	0.00	0.00	0.00	18.75	38.82	39.08	39.25	39.56	38.67	0.00	39.07
19	32.84	0.00	0.00	0.00	18.73	38.88	39.15	39.32	39.55	30.94	0.00	38.53
20	32.77	0.00	0.00	0.00	18.63	38.76	39.08	39.30	39.60	23.15	0.00	38.03
21	33.12	0.00	0.00	0.00	18.58	38.99	38.89	39.32	39.57	15.44	0.00	37.79
22	33.27	0.00	0.00	0.00	19.81	38.95	38.90	39.17	39.42	7.73	0.00	37.71
23	33.64	0.00	0.00	9.83	24.09	38.83	38.92	39.82	39.05	0.00	0.00	37.59
24	26.65	0.00	0.00	15.94	28.19	38.07	38.87	40.31	38.95	0.00	0.00	37.90
25	20.16	0.00	0.00	23.37	31.98	38.17	39.09	40.31	38.88	0.00	0.00	38.20
26	13.26	0.00	0.00	31.27	35.96	37.94	39.20	40.30	38.86	0.00	0.00	38.14
27	6.62	0.00	0.00	39.91	38.81	38.13	39.29	40.44	38.89	0.00	0.00	38.06
28	0.00	0.00	0.00	38.37	38.62	38.39	39.35	39.90	39.22	0.00	0.00	38.20
29	0.00	0.00	0.00	39.44	38.75	39.28	39.42	31.55	39.27	0.00	0.00	38.13
30	0.00	0.00	0.00	38.89	39.14	39.61	39.94	23.67	39.36	0.00	7.81	38.45
31	0.00	0.00	0.00	38.74	31.46	39.99	39.89	15.84	39.57	0.00	15.62	30.96

Appendix C.14 –Pivot 7 Consecutive 5-Day Application Depths in mm (Should be <64 mm to Comply with Condition 7)

Day	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
1												
2												
3												
4												
5	30.31	34.51	42.15	48.23	34.42	42.21	46.02	43.51	49.26	37.42	42.79	38.71
6	35.72	36.16	37.46	47.78	30.74	43.51	48.66	46.23	49.90	34.42	42.87	29.30
7	44.96	38.05	37.27	48.70	30.17	39.40	50.65	49.58	46.72	38.99	46.33	27.92
8	44.19	39.64	36.26	43.86	30.16	38.46	53.95	45.88	41.80	40.80	48.01	21.29
9	37.02	39.97	39.66	44.56	33.40	41.73	49.01	45.78	42.57	41.85	50.48	18.62
10	37.11	42.23	39.65	44.37	32.61	40.66	43.90	45.62	42.39	43.89	50.36	21.34
11	37.60	43.50	43.14	44.51	32.30	40.84	41.01	48.18	39.33	43.11	51.16	26.73
12	36.09	42.64	43.08	44.19	37.23	44.93	30.11	50.08	37.38	40.80	52.35	29.71
13	35.15	43.47	46.12	48.80	40.33	46.54	19.07	53.65	36.96	40.56	47.93	25.10
14	34.12	41.38	43.18	48.08	39.70	47.92	13.12	50.67	36.21	43.52	47.54	20.39
15	36.02	40.90	45.25	43.17	39.76	47.11	7.41	45.10	36.18	40.04	42.34	18.10
16	35.72	38.99	44.31	42.86	44.47	43.20	0.00	39.72	39.15	41.57	40.25	11.76
17	36.72	40.04	46.03	41.78	43.74	42.95	0.00	39.75	44.18	40.99	36.63	13.71
18	37.41	40.67	46.14	38.34	45.26	43.11	0.00	39.89	46.17	44.16	39.42	19.98
19	39.62	41.39	46.56	38.93	44.72	43.30	0.00	42.57	47.68	40.12	37.66	24.18
20	37.58	42.18	46.50	39.06	45.44	45.31	0.00	47.20	48.53	42.79	39.21	23.33
21	39.50	41.08	48.28	35.80	42.47	48.79	0.00	50.72	45.82	40.81	38.84	25.21
22	36.77	43.69	43.44	35.21	38.30	48.26	0.00	50.72	40.44	43.80	41.04	23.72
23	36.10	39.77	43.39	38.35	37.86	44.54	0.00	50.39	43.60	43.95	40.44	17.72
24	35.11	42.16	45.70	28.59	39.44	44.18	0.00	50.67	45.19	44.34	41.32	21.48
25	34.57	40.93	41.15	23.64	38.14	44.02	0.00	47.97	42.91	43.61	43.02	26.53
26	33.54	42.51	38.70	17.44	41.03	44.34	0.00	46.25	45.06	45.79	44.71	28.04
27	34.98	42.47	38.00	9.44	45.96	45.39	0.00	42.51	45.81	45.96	45.97	22.90
28	34.53	46.83	35.75	0.00	45.50	48.79	0.00	42.73	45.98	44.79	48.05	22.92
29	34.44	44.30	34.78	8.24	43.02	47.72	0.00	32.00	46.15	47.55	47.83	19.78
30	35.37	44.61	39.39	15.45	43.24	45.39	0.00	24.78	46.58	45.50	48.37	16.81
31	37.28	43.66	31.93	23.26	33.66	42.72	0.00	17.67	47.22	36.82	46.81	13.23

Appendix D Sampling Results for Conditions 9 and 21

Month	Week	FEC	NH_3	NNN	TKN	TN	TP	ECO	T-BOD	pH	SS	TK	TNA
		cfu/100 ml	g/m³	g/m³	g/m³	g/m³	g/m³	cfu/100 ml	g/m3		g/m³	g/m³	g/m³
Jul-18	Week 1	40	1.150	3.5	3.5	7.0	4.0	20	7.0	7.7	7.0	17.3	78
	Week 2	130	0.114	3.4	2.4	5.8	3.0	50	5.0	7.4	8.0	16.2	74
	Week 3	120	0.480	4.9	2.8	7.7	3.5	40	6.0	7.4	8.0	16.0	76
	Week 4	150	0.169	3.7	2.7	6.3	1.8	60	4.0	7.4	7.0	15.5	74
Aug-18	Week 1	110	0.470	2.3	5.5	5.8	4.4	90	7.0	7.7	9.0	16.0	81
	Week 2	230	0.196	3.0	4.0	6.9	1.3	110	12.0	7.3	16.0	14.7	83
	Week 3	110	0.111	0.8	3.0	3.8	1.4	60	5.0	7.6	10.0	15.8	89
	Week 4	13000	0.650	1.2	3.0	4.2	1.7	9000	11.0	7.7	11.0	15.6	87
	Week 5	470	0.078	1.0	2.3	3.3	1.4	200	6.0	7.7	9.0	16.2	84
Sep-18	Week 1	130	0.078	1.3	2.4	3.7	1.1	80	6.0	7.4	10.0	15.8	75
	Week 2	290	1.020	1.8	3.7	5.5	5.7	150	6.0	7.1	11.0	17.9	84
	Week 3	3100	0.900	0.8	2.6	3.3	5.6	1300	7.0	7.5	11.0	19.5	90
	Week 4	400	1.340	1.2	4.2	5.4	1.9	160	4.0	7.9	13.0	17.7	88
Oct-18	Week 1	290	0.103	0.5	2.9	3.4	2.3	80	4.0	7.9	13.0	18.1	92
	Week 2	8400	7.000	2.1	9.5	11.6	6.6	6100	10.0	7.6	9.0	18.1	91
	Week 3	250	0.270	1.5	2.7	4.2	4.5	170	6.0	7.7	7.0	18.9	87
	Week 4	20	0.106	0.7	1.9	2.6	2.2	20	5.0	7.9	4.0	17.5	90
	Week 5	190	0.179	1.2	2.0	3.1	7.0	70	5.0	7.6	7.0	18.8	91
Nov-18	Week 1	370	0.260	0.4	2.4	2.8	4.5	340	4.0	7.6	6.0	17.8	93
	Week 2	400	0.250	0.8	2.1	3.0	9.1	200	4.0	7.3	6.0	19.1	92
	Week 3	110	0.157	0.1	2.1	2.2	3.4	60	6.0	7.6	6.0	18.0	98
	Week 4	1400	0.106	1.4	2.3	3.6	5.7	700	5.0	7.6	6.0	18.0	94
Dec-18	Week 1	60	2.800	1.7	5.5	7.2	15.4	20	7.0	7.5	11.0	23.0	94
	Week 2	70	0.137	1.2	2.3	3.5	4.6	30	4.0	7.8	6.0	21.0	88
	Week 3	140	0.770	0.8	2.7	3.5	3.7	80	4.0	7.9	6.0	19.1	84
	Week 4	75	0.230	3.9	2.2	6.1	1.4	30	4.0	7.9	3.0	18.5	81
Jan-19	Week 1	330	0.122	2.2	1.8	4.0	1.1	20	2.0	7.7	3.0	18.4	94
	Week 2	250	0.104	2.6	2.0	4.6	4.1	220	3.0	7.6	5.0	18.8	86
	Week 3	280	0.077	2.7	1.9	4.6	3.2	210	4.0	8.0	5.0	18.7	87
	Week 4	320	0.200	0.8	2.3	3.1	3.0	240	4.0	7.8	6.0	19.2	87
	Week 5	210	0.124	5.2	1.8	7.0	5.4	80	2.0	7.9	5.0	18.5	85
Feb-19	Week 1	180	0.182	5.1	2.0	7.1	7.4	120	3.0	7.7	4.0	23.0	110
	Week 2	130	0.165	4.5	2.5	7.0	6.0	30	3.0	7.8	6.0	21.0	92
	Week 3	180	0.250	2.9	24.0	5.3	3.8	40	3.0	7.9	10.0	18.5	83

Month	Week	FEC	NH_3	NNN	TKN	TN	TP	ECO	T-BOD	pH	SS	TK	TNA
		cfu/100 ml	g/m³	g/m³	g/m³	g/m³	g/m³	cfu/100 ml	g/m3		g/m³	g/m³	g/m³
	Week 4	900	0.164	3.1	2.5	5.6	3.0	100	4.0	7.6	7.0	19.3	82
Mar-19	Week 1	3800	0.230	4.4	2.5	6.9	3.5	3700	7.0	7.8	10.0	18.3	84
	Week 2	780	0.092	3.7	2.2	5.9	3.2	780	4.0	7.8	10.0	18.2	87
	Week 3	350	0.100	4.9	1.9	6.9	7.3	130	5.0	7.4	8.0	19.9	82
	Week 4	160	0.089	4.1	1.8	5.9	4.2	100	3.0	7.8	4.0	18.6	96
Apr-19	Week 1	150	0.071	4.0	1.5	5.6	5.0	40	3.0	7.6	3.0	18.6	81
	Week 2	1150	0.097	4.5	2.0	6.5	3.0	200	4.0	7.5	4.0	17.1	86
	Week 3	4800	0.100	4.1	1.7	5.8	3.6	300	2.0	7.9	3.0	18.4	90
	Week 4	130	0.099	2.2	1.7	3.9	2.0	40	2.0	7.9	3.0	16.8	93
May-19	Week 1	30	0.106	3.7	2.0	5.7	4.8	30	5.0	7.6	6.0	17.2	82
	Week 2	50	0.130	5.5	3.0	8.5	6.1	30	6.0	7.5	9.0	17.1	86
	Week 3	730	0.142	3.8	3.0	6.9	4.4	60	7.0	7.5	9.0	16.9	98
	Week 4	590	0.110	6.5	1.9	8.4	6.8	190	4.0	7.5	5.0	18.5	82
	Week 5	630	0.081	4.7	2.0	6.7	2.8	120	4.0	7.8	5.0	15.3	91
Jun-19	Week 1	810	0.092	6.6	2.0	8.6	2.4	190	4.0	7.5	5.0	14.9	79
	Week 2	430	0.093	3.1	2.8	5.9	1.1	90	6.0	7.7	7.0	15.1	86
	Week 3	100	0.080	4.8	2.0	6.8	0.6	40	3.0	7.6	4.0	16.2	79
	Week 4	40	0.057	4.7	1.7	6.4	0.8	10	3.0	7.7	3.0	16.6	88
Median		**240**	**0.1335**	**2.95**	**2.3**	**5.75**	**3.55**	**90**	**4**	**7.65**	**6.5**	**18.05**	**87**
95th Percentile		**4250**	**1.24**	**5.335**	**5.50**	**8.4**	**7.345**	**2380**	**8**	**7.9**	**12**	**21**	**97**

Appendix E Cut and Carry – Harvesting Dates

Harvesting Dates, Total Nitrogen Harvetsed (kg). Irri/No Irr indicates whether or not there was irrigation.

Month/Year	Centre Pivot 1		Centre Pivot 2		Centre Pivot 3		Centre Pivot 4		Centre Pivot 5			Centre Pivot 7	
Day	Nov 2018	Feb 2019	Nov 2018	Feb 2019	Nov 2018	Mar 2019	Dec 2018	Mar 2019	Sept 2018	Dec 2018	Mar 2019	Oct 2018	Jan 2019
8	Irri	No Irr	Irri	No Irr	Irri	Irri	Irri	Irri	Irri	No Irr	Irri	Irri	Irri
9	Irri	No Irr	Irri	No Irr	Irri	Irri	Irri	No Irr	Irri	No Irr	No Irr	Irri	Irri
10	Irri	No Irr	Irri	No Irr	Irri	Irri	Irri	No Irr	Irri	No Irr	No Irr	Irri	Irri
11	Irri	No Irr	Irri	No Irr	Irri	Irri	Irri	No Irr	Irri	1004	No Irr	Irri	Irri
12	Irri	No Irr	Irri	No Irr	Irri	Irri	Irri	1167	Irri	Irri	1126	Irri	No Irr
13	No Irr	567	No Irr	455	Irri	Irri	Irri	No Irr	Irri	No Irr	No Irr	Irri	No Irr
14	1066	No Irr	1056	No Irr	Irri	Irri	No Irr	No Irr	Irri	No Irr	No Irr	Irri	No Irr
15	No Irr	No Irr	No Irr	No Irr	No Irr	Irri	Irri	Irri	Irri	No Irr	Irri	Irri	2278
16	No Irr	Irri	No Irr	Irri	No Irr	No Irr	Irri	Irri	Irri	No Irr	Irri	Irri	No Irr
17	No Irr	No Irr	No Irr	No Irr	No Irr	No Irr	Irri	Irri	Irri	No Irr	Irri	Irri	No Irr
18	No Irr	No Irr	No Irr	No Irr	No Irr	534	Irri	Irri	Irri	Irri	Irri	Irri	No Irr
19	Irri	No Irr	Irri	No Irr	Irri	No Irr	No Irr	Irri	Irri	Irri	Irri	Irri	No Irr
20	Irri	Irri	Irri	Irri	No Irr	No Irr	No Irr	Irri	Irri	Irri	Irri	Irri	No Irr
21	Irri	Irri	Irri	Irri	1105	No Irr	1137	Irri	Irri	Irri	Irri	Irri	No Irr
22	Irri	Irri	Irri	Irri	No Irr	No Irr	Irri	Irri	Irri	Irri	Irri	Irri	No Irr
23	Irri	Irri	Irri	No Irr	No Irr	No Irr	Irri	Irri	Irri	Irri	Irri	Irri	No Irr
24	Irri	Irri	Irri	Irri	No Irr	No Irr	Irri	Irri	Irri	Irri	Irri	No Irr	No Irr
25	Irri	Irri	Irri	Irri	No Irr	No Irr	No Irr	Irri	Irri	Irri	Irri	No Irr	No Irr
26	Irri	Irri	Irri	Irri	No Irr	No Irr	No Irr	No Irr	No Irr	Irri	Irri	No Irr	No Irr
27	Irri	Irri	Irri	Irri	No Irr	No Irr	No Irr	No Irr	1136	Irri	Irri	No Irr	No Irr
28	Irri	Irri	Irri	Irri	No Irr	No Irr	No Irr	Irri	No Irr	Irri	Irri	No Irr	No Irr
29	Irri	No Irr	Irri	No Irr	No Irr	No Irr	No Irr	Irri	Irri	Irri	Irri	4073	No Irr
30	Irri	No Irr	Irri	No Irr	No Irr	No Irr	No Irr	Irri	No Irr	Irri	Irri	Irri	No Irr
31	No Irr	No Irr	No Irr	No Irr	No Irr	No Irr	No Irr	Irri	No Irr	Irri	Irri	Irri	No Irr

Appendix F Bore Sampling Results for Condition 25

Table F.1 – Nitrate Bore Sampling Results for the Period 1 July 2018 – 30 June 2019

		Upstream Bores (Nitrates g/m³)			Downstream Bores (Nitrates g/m3)										
	Bore No	**BX23/0204**	**BX23/0205**	**BX23/0878**	**M36/7462**	**M36/7463**	**M36/7667**	**M36/7668**	**BX23/0206**	**BX23/0207**	**M36/20415**	**M36/20416**	**M36/7464**	**BX23/0208**	**Condition 25(d)(i) - (Yes - Complies/No - Does Not Comply)**
	Depth	**22.5**	**24**	**18**					**13.9**	**14**			**16.5**	**17**	
Date	**Purpose**														
24-Jul-18		2.75	3.86		2.77	0.976	3.32	0.656	6.52	1.53	3.96	2.22	3.42	0.002	Yes - Complies
28-Aug-18		3	4.1		3.4	1.46	1.51	0.57	8.4	0.81	4.3	3.5	3.7	2.6	No-Does Not Comply
5-Sep-18		6.2	6.3						8.7						Yes - Complies
25-Sep-18		5.9	7.1		2	2.1	3.9	0.68	8.5	2.7	3.9	3.2	4	0.017	Yes - Complies
30-Oct-18		4.7	6.5		2.9	1.39	0.98	0.43	9.2	4	3.1	2.5	2.7	0.004	No-Does Not Comply
20-Nov-18		1.5	6.7		3.1	1.5	2.9	0.91	8	2.9	3	1.5	2.9	0.002	Yes - Complies
18-Dec-18		5.5	5		2.7	1.81	4.5	0.58	8.5	4.3	3.2	0.183	5.2	0.039	No-Does Not Comply
29-Jan-19					5	0.88	1.43	0.82	8.5	2.4	3.5	4.1	5.8	8.1	Yes - Complies
28-Feb-19		4.3	4.4	23	6.7	1.21	1.33	1.05	5.2	0.22	5.9	4	4.6	0.28	Yes - Complies
25-Mar-19		0.12	6.5	24	6.5	1.22	1.14	1.72	8.6	1	6.4	3.7	4.6	0.003	Yes - Complies
29-Apr-19		2.9	9.1	22	10.3	6.2	1.39	6.8	5.3	0.62	10	3.6	7.3	3.4	Yes - Complies
23-May-19		5.2	9.4	23	3.3	1.38	1.31	1.12	0.74	0.74	7.1	3.7	6.1	0.33	Yes - Complies
Averages		**3.82**	**6.27**	**23.00**	**4.42**	**1.83**	**2.16**	**1.39**	**7.18**	**1.93**	**4.94**	**2.93**	**4.57**	**1.34**	Yes - Complies

Bore BX23/0878 was commissioned in February 2019

Table F.2 – E. Coli Sampling Results for the Period 1 July 2018 - 30 June 2019

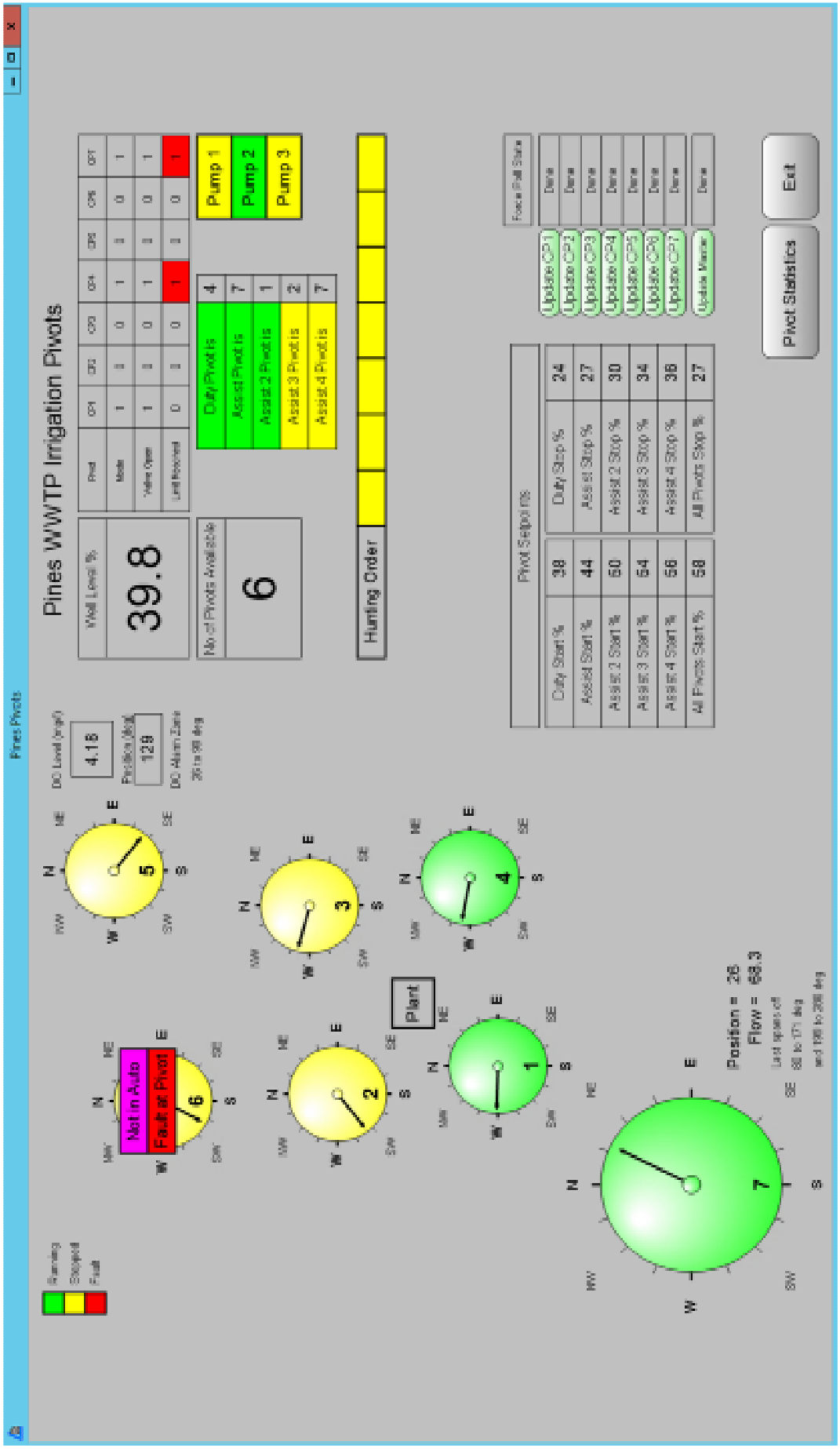
	Upstream Bores (MPN/100 mL)						Downstream Bores (MPN/100 mL)																			
Date	**BX23/0204**		**BX23/0205**		**BX23/0878**		**M36/7462**		**M36/7463**		**M36/7667**		**M36/7668**		**BX23/0206**		**BX23/0207**		**M36/20415**		**M36/20416**		**M36/7464**		**BX23/0208**	
	22.5		**24**		**18**										**13.9**		**14**						**16.5**		**17**	
	FC	E.Coli	FC	E.Coli	FC	E.Coli	FC	E.Coli	FC	E.Coli	FC	E.Coli	FC	E.Coli	FC	E.Coli	FC	E.Coli	FC	E.Coli	FC	E.Coli	FC	E.Coli	FC	E.Coli
24-Jul-18	<1	<1	<1	<1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
28-Aug-18	<1	<1	<1	<1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
25-Sep-18	<1	<1	<1	<1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	15	15	56	44	<1	<1	<1	<1
30-Oct-18	<1	<1	<1	<1			<1	<1	<1	<1	<1	<1	5	5	<1	<1	<1	<1	31	31	3	3	<1	<1	<1	<1
20-Nov-18	<1	<1	<1	<1			<1	<1	<1	<1	<1	<1	5	5	<1	<1	<1	<1	32	28	210	200	<1	<1	<1	<1
18-Dec-18	<1	<1	<1	<1			<1	<1	<1	<1	<1	<1	5	5	<1	<1	<1	<1	4	4	1	1	<1	<1	<1	<1
29-Jan-19	<1	<1	<1	<1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
28-Feb-19	<1	<1	<1	<1	<1	<1	510	40	<1	<1	<1	<1	5	5	<1	<1	<1	<1	11	2	4	2	<1	<1	<1	<1
25-Mar-19	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	3	2	<1	<1	<1	<1
29-Apr-19	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1
23-May-19	<1	<1	<1	<1	8	8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	3	2	<1	<1	<1	<1

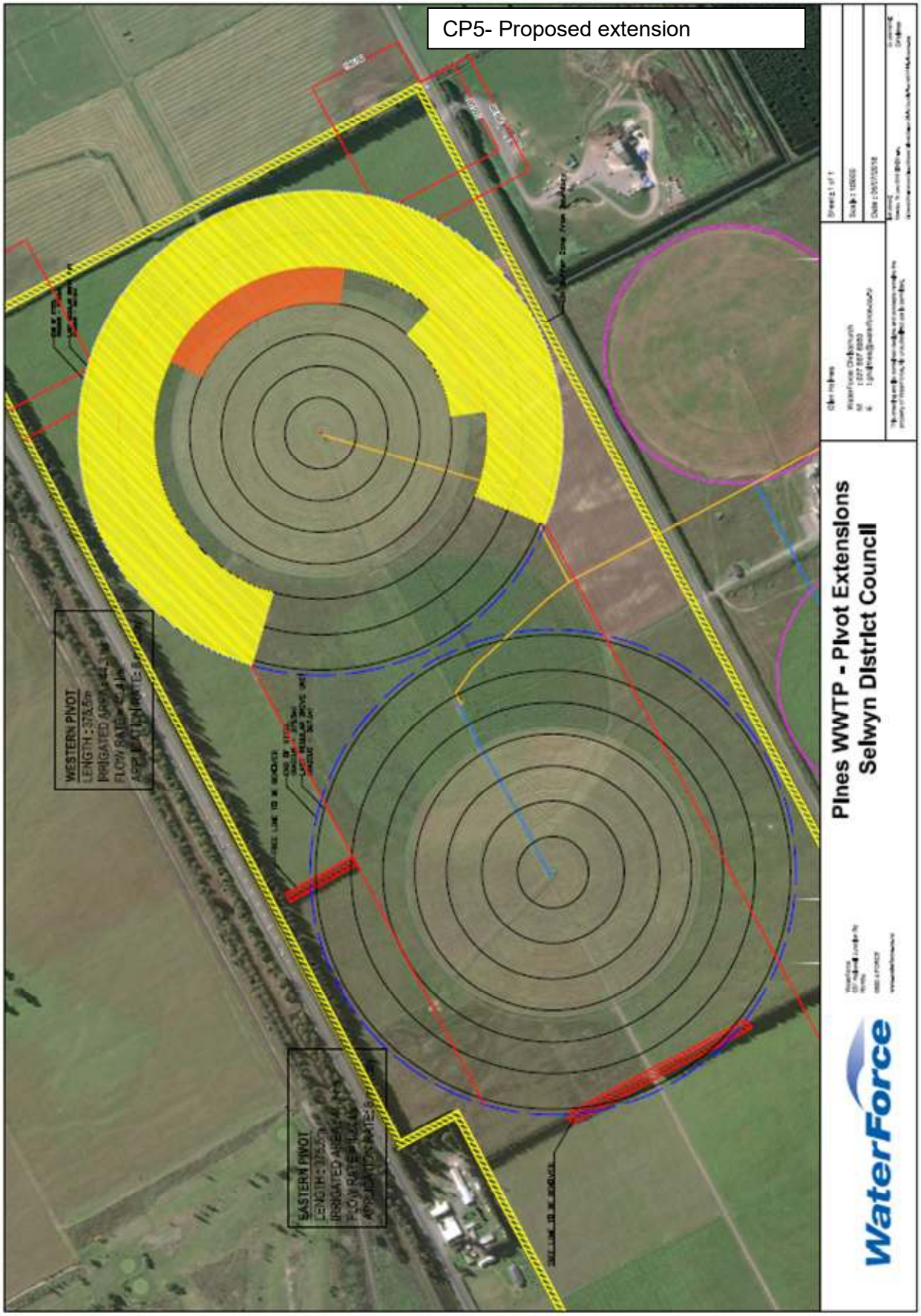
FC – Faecal Coliforms

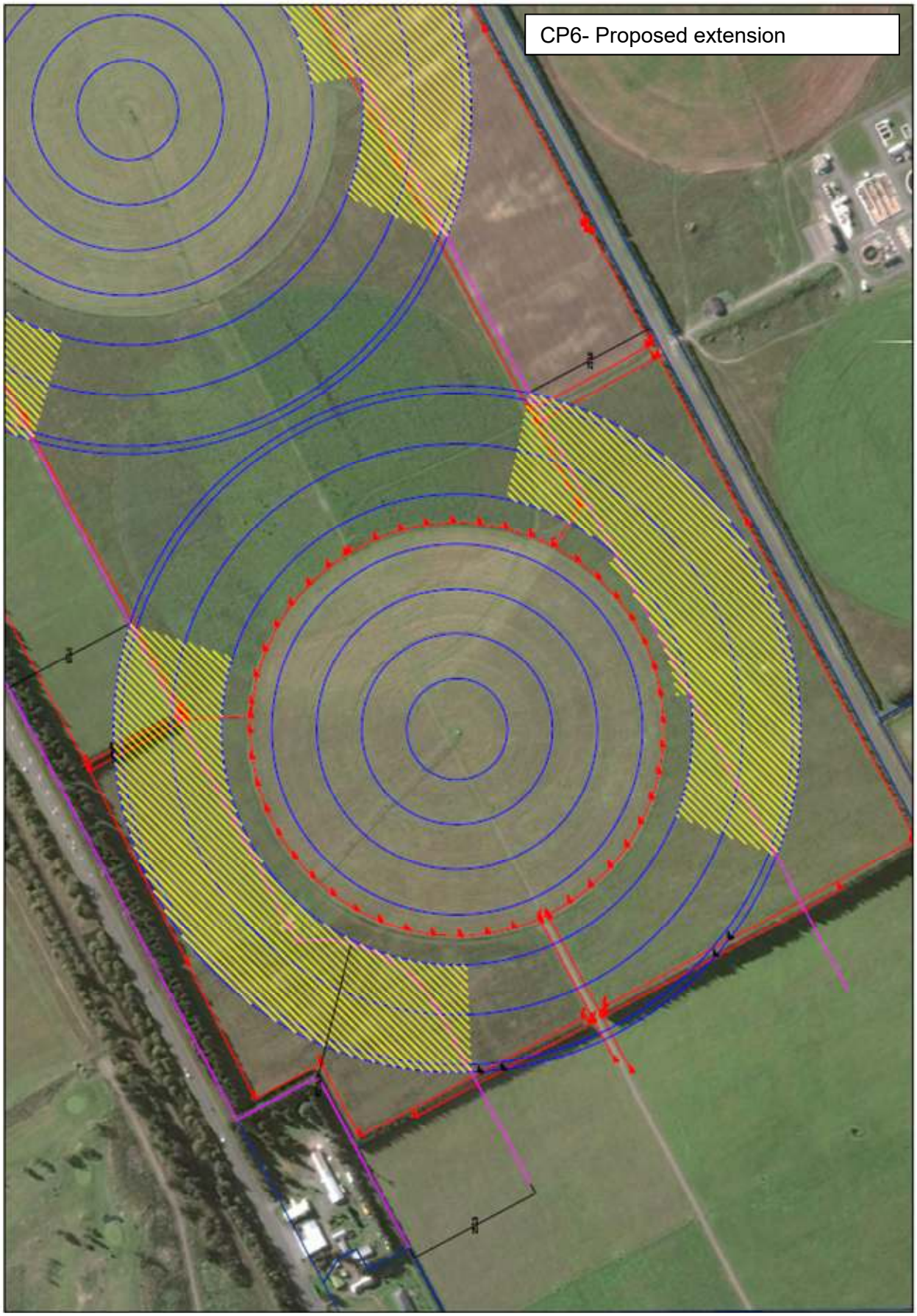
Appendix G Soil Sampling Results

Determinand	Limits	Center Pivot 1		Center Pivot 2		Center Pivot 3		Center Pivot 4		Center Pivot 5		Center Pivot 6		Center Pivot 7	
		Jul-18	**Jan-19**	**Jul-18**	**Jan-19**	**Jul-18**	**Jan-19**	**Jul-18**	**Jan-19**	**Jul-18**	**Jan-19**	**Jul-18**	**Jan-19**	**Jul-18**	**Jan-19**
Arsenic (mg/kg DS)	20.0	3	2.7	2.9	2.6	3.0	2.8	3.1	2.9	2.7	2.6	3.2	2.4	3.3	3.4
Cadmium (mg/kg DS)	1.000	0.048	0.051	0.054	0.052	0.024	0.039	0.028	0.027	0.026	0.024	0.043	0.025	0.040	0.044
Chromium (mg/kg DS)	600.0	10.0	11.9	9.5	11.7	9.5	10.1	9.3	11.5	8.8	10.5	10.4	10.0	10.9	12.2
Copper (mg/kg DS)	100.0	3.3	3.2	3.8	2.8	3.3	3.6	3.2	3.5	3.4	2.9	3.3	2.7	4.6	4.3
Lead (mg/kg DS)	300.0	11.4	11.4	10.6	11.2	10.6	11.5	10.6	11.1	10.9	12.7	12.6	11.8	12.4	12.7
Mercury (mg/kg DS)	1.000	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.020	<0.02	0.030
Nickel (mg/kg DS)	60.0	6.2	6.1	6.2	6.3	5.9	5.8	5.9	6.0	5.8	5.9	6.3	5.9	7.3	7.8
Phosphorus (mg/kg DS)		720	710	650	510	540	580	570	630	420	340	470	310	540	500
Zinc (mg/kg DS)	300	39	48	40	47	35	47	35	45	35	42	37	38	38	43
Nitrogen (g/100g DS)		0.30	0.29	0.27	0.25	0.21	0.22	0.27	0.25	0.18	0.23	0.30	0.20	0.26	0.26
pH		6.7	6.8	6.6	6.8	6.8	6.9	6.8	6.6	6.8	6.7	6.6	6.4	6.6	6.9
Olsen Phosphorus		30	30	25	14	31	33	37	34	21	17	17	8	21	18
Potassium (me/100g)		0.62	0.62	0.58	0.30	0.55	0.76	0.62	0.60	0.22	0.25	0.28	0.17	0.36	0.34
Calcium (me/100g)		8.1	8.2	7.7	6.5	9.5	9.7	12.6	10.2	7.9	9.6	9.4	6.8	10.8	10.0
Magnesium (me/100g)		1.18	1.18	1.17	1.06	1.52	1.43	1.61	1.31	1.10	1.15	1.31	1.13	1.37	1.04
Sodium (me/100g)		0.69	1.05	0.61	0.81	0.76	1.21	0.75	0.93	0.73	1.00	0.78	0.77	1.09	0.95
CEC (me/100g)		15	15	12	12	17	17	20	17	13	16	17	14	20	16
Total Base Saturation		70	74	81	71	74	76	77	77	74	74	68	63	70	78
Volume Weight		0.94	0.89	0.96	1	0.87	0.79	0.95	0.86	1	0.9	0.94	0.99	0.82	0.97
Organics (%)		6.2	6.6	5.7	5.4	7.4	9.8	9.0	7.3	5.4	6.4	6.0	5.6	8.4	7.0
Total Carbon		3.6	3.8	3.3	3.1	4.3	5.7	5.2	4.2	3.1	3.7	3.5	3.2	4.9	4.1

Appendix H Planned Irrigation Area Extensions


Pines Pivots
Pines WWTP Irrigation Pivots
Well Level %
39.8
Pivot
Mode
Yellow Open
Limit Reached
Duty Pivot is
Assist Pivot is
Assist 2 Pivot is
Assist 3 Pivot is
Assist 4 Pivot is
Pump 1
Pump 2
Pump 3
No of Pivots Available
6
Hunting Order
Pivot Setpoints
Duty Start %
Assist Start %
Assist 2 Start %
Assist 3 Start %
Assist 4 Start %
All Pivots Start %
Duty Stop %
Assist Stop %
Assist 2 Stop %
Assist 3 Stop %
Assist 4 Stop %
All Pivots Stop %
Pivot Statistics
Exit
Not in Auto
Fault at Pivot
Plant
Position = 26
Flow = 68.3


CP5- Proposed extension
WESTERN PIVOT
LENGTH : 375.5m
EASTERN PIVOT
Pines WWTP - Pivot Extensions
Selwyn District Council
WaterForce


CP6- Proposed extension

From:	Trinity White
To:	"Gareth Morgan"
Cc:	Amit Chauhan; Johannes Welsch
Subject:	CRC0401100.1 & CRC153952 Pines Visit - Substantiated Odour
Date:	Thursday, 16 January 2020 1:18:00 PM
Attachments:	image001.png image003.jpg

Good afternoon Gareth,

I hope this email finds you well.

Thank you for your email. I am happy to answer your queries and provide clarification on my statements where required. However, I would also like to be clear at the outset of this email that I am 100% confident that the odour noted beyond the boundary was the same odour as that observed outside of the Pines drying room and that the drying room was the source of the odour.

1. "*However, now that odour has been substantiated beyond the property boundary from the Pines WWTP drying room, I consider an elevated response will be required*"

    a. Please confirm, where (location) beyond the Pines WwTP property boundary was the odour claimed to be ?
    Please refer to the map with the GPS location of the assessment location.

cid:image001.png@01D5B66F.22CEF030

b. What is the odour ?

The odour observed at the above location was consistent with the odour observed outside the Pines drying room during my site inspection moments earlier.

c. How has the alleged odour been substantiated as emanating from the Pines WwTP ?

Yes – please refer to the comments made under 1(d).

d. Please confirm, how have you assessed and then separated the alleged odour as being from the Pines WwTP, from the numerous other odours clearly existent within the general area ?

A 10min odour assessment was conducted at the location identified above. This assessment involves recording the presence, intensity and characteristics of any odour present at 10 second intervals. The only odour noted during this assessment was consistent with the odour coming from the drying room. Following this two upwind assessment were carried out to rule out the likelihood of the odour coming from another source. Additionally, the odour outside the drying room was very distinct and the odour noted beyond the boundary had the exact same odour characteristics. Further to this, upon completion of the 10 minute assessment I asked Chris and Amit if they both agreed the odour observed at this location was the same odour as that noted outside the drying room and if they agreed the odour was from the Pines

WWTP. Both Chris and Amit agreed. This was noted in my warrant book contemporaneously (See below). I am disappointed to hear that this acknowledgement has been withdrawn.

cid:image003.jpg@01D5B67F.039FE510

2. *"Obviously you are now also non-compliant with Condition 3 of CRC040100.1 which states: "The wastewater treatment and sludge drying operations shall not cause any odour or dust particles that are offensive or objectionable beyond the property boundary of the consent holder." and therefore, actions will be required to address this non-compliance"*

    a. How is this non-compliant, given the existence of the numerous odours from the many general rural life practices within the general area ?
    This condition is non-compliant because an odour that would be considered offensive or objectionable beyond the boundary originating from the Pines was detected.

    b. As per ref *1.d* above, how has the alleged odour been separated from those odours and classified as being from the Pines WwTP ?
    The odour was very distinctive and matched exactly of the odour noted outside of the drying room. Please also refer to the comments made under 1(d).

    c. What is "offensive & objectionable" ? Subjective terms used explicitly but without definition nor determination, relating to different things to different people and their tolerances.
    The terms offensive and objectionable are the terms used in the MFE Good Practice Guide for Assessing and Managing Odour (https://www.mfe.govt.nz/sites/default/files/media/Air/good-practice-guide-odour.pdf). Subjectivity is removed as far as possible by going through a FIDOL assessment as per the guidelines.

    d. In your own assessment, you classified your odour experience beyond the property boundary as being reduced and for short periods. To be non-compliant would surely require experiences of a strong and noticeable odour for prolong periods, not weak and momentary. A brief, unqualified and subjective experience does not equate to non-compliance.
    The MFE guidelines state that offensive and objectionable effects can be caused by:
    - "High-intensity and/or highly unpleasant odours occurring infrequently or for short periods (a few minutes to an hour) (acute), and/or
    - Low-intensity and/or moderately unpleasant odours occurring frequently or

continuously over a long period (chronic)."

During my assessment I determined the odour to be acute based on the fact the throughout the 10minute assessment I noted the odour was of varying intensity, highly unpleasant (when occurring) and occurring for short periods of time.

3. "*I have been receiving complaints from 5 different residents along Burnham Road*"

   a. Council is only aware of one-complainant, who are the five-different residents ? Without this knowledge how can Council address their alleged concerns.

      Amit was informed of the presence of multiple complainants on the 27th of November.

   b. Are ECAN confident that this relates to five-separate complaints or, one-complainant with four-supporters ?

      Yes, I have spoken with each of the complainants individually.

   c. We are aware that the one-complainant on Burnham Rd, who is a direct 2.0KM South-West of the Pines WwTP and advises experiences odours during certain wind directions. Yet, 2.0Km to the North, is a densely populated residential area of Rolleston, has no records of odour complaints on opposing wind directions.

   d. Also, at this time of reviewing and assessing, it is not helpful to either the complainant residents nor to Council, when blame is instantly verbalised without the substantiating of the situation.

4. "*I want to be clear that I do not agree with your determination. The odour outside the drying room was extremely strong and offensive on the day I visited the site (although not a breach), and in my opinion the corresponding odour beyond the property boundary, although reduced was still strong at times and considered to be objectionable even if it was to only occur for short periods of time. This is a clear breach of Condition 3*"

   a. Similarly, Council does not agree with your determination and believes it's made in the absence of any evidence nor supporting validations.

      Evidence is in the form of my observations, the completed odour assessment and the contemporaneous notes in my warrant book confirming SDC and Sicon agreed at that time the odour noted on Burnham Road was the same odour as that noted outside of the Pines drying room and was from the Pines WWTP.

5. "*Further to this, as* ***we did not undertake an odour assessment*** *at Trevor's house I do not* ***believe*** *we can be confident there was no odour at his property*"

   a. Then please explain, if you did not undertake an odour assessment at Trevor's house, how can you determine that an odour was present and that the Pines WwTP is not complaint as a result. Your statement is based on *quote* "believe" and not supported by factual evidence by your own statement.

      Please refer to the comments made under 4(a).

   b. Although, as you are fully aware, Council has undertook odour assessments at Trevor's house recently, which did not produce the results that Trevor had hoped for, confirming that no odour was emanating from the Pines WwTP. Yet this is discounted by you.

      Noted. This has not been discounted, I acknowledge that an assessment has been undertaken at Trevor's house and that no odour was substantiated at that time. When referring to a substantiated odour and non-compliance I refer specifically to the odour noted by on the 12th of December.

It is timely to remind ourselves that, over the past few years, Council has repeatedly

responded to many odour concerns raised by various ECAN officers, as the natural default has been to simply lay blame at the source being the Pines WwTP, only for Council's investigations to discover that over this period of time, many of those odour complaints (if not all TBH), can be directly attributed to a Global ECAN approved pig-effluent disposal consent holder discharging on nearby land.

I take your concerns on board. Amit has raised similar concerns in the past and as a result Robson's discharge records have been reviewed to gain an understanding of where and when Robson's was discharging in the area. Robsons was not discharging at either of the nearby properties on the 12th of December. Further to this, during conversations with Amit last week I advised I would ask the ECan monitoring officer responsible for Robsons to conduct an odour assessment for Robsons when they are discharging at one of the nearby properties in the near future.

Council is concerned at the same automatic association of blame for odours being labelled as from the Pines WwTP, when it is very evident that there are many, general and rural life practices surrounding this area and properties which give rise to odours.

I understand your concerns, however, as previously stated I am very confident the odour noted on the 12th of December was from the Pines drying room as it was very distinctive and consistent with the odour noted on site.

Nevertheless, Council is committed to supporting its residents and has been communicating openly with them and working to resolve their concerns. We are planning to discuss these concerns further in an open-meeting early in the new year, which will be attended by their District Councillors.

Kind regards,

Trinity White

From: Gareth Morgan <xxxxxx.xxxxxx@xxxxxx.xxxx.xx>
Sent: Wednesday, 18 December 2019 4:03 PM
To: Trinity White <xxxxxxx.xxxxx@xxxx.xxxx.xx>
Cc: Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx>
Subject: RE: CRC0401100.1 & CRC153952 Pines Visit - Substantiated Odour

Trinity,

Amit has passed to me, a copy of your recent email relating to the notification of non-compliance odours at the Pines WwTP, which contains some content and comments that I have to say, Council does not agree with.

For ease of response, I have referenced those comments as,

1. "*However, now that odour has been substantiated beyond the property boundary from the Pines WWTP drying room, I consider an elevated response will be required*"

    a. Please confirm, where (location) beyond the Pines WwTP property boundary was the odour claimed to be ?
    b. What is the odour ?
    c. How has the alleged odour been substantiated as emanating from the Pines WwTP ?
    d. Please confirm, how have you assessed and then separated the alleged odour as being from the Pines WwTP, from the numerous other odours clearly existent within the general area ?

2. *"Obviously you are now also non-compliant with Condition 3 of CRC040100.1 which states: "The wastewater treatment and sludge drying operations shall not cause any odour or dust particles that are offensive or objectionable beyond the property boundary of the consent holder." and therefore, actions will be required to address this non-compliance"*

    a. How is this non-compliant, given the existence of the numerous odours from the many general rural life practices within the general area ?
    b. As per ref *1.d* above, how has the alleged odour been separated from those odours and classified as being from the Pines WwTP ?
    c. What is "offensive & objectionable" ? Subjective terms used explicitly but without definition nor determination, relating to different things to different people and their tolerances.
    d. In your own assessment, you classified your odour experience beyond the property boundary as being reduced and for short periods. To be non-compliant would surely require experiences of a strong and noticeable odour for prolong periods, not weak and momentary. A brief, unqualified and subjective experience does not equate to non-compliance.

3. *"I have been receiving complaints from 5 different residents along Burnham Road"*

    a. Council is only aware of one-complainant, who are the five-different residents ? Without this knowledge how can Council address their alleged concerns.
    b. Are ECAN confident that this relates to five-separate complaints or, one-complainant with four-supporters ?
    c. We are aware that the one-complainant on Burnham Rd, who is a direct 2.0KM South-West of the Pines WwTP and advises experiences odours during certain wind directions. Yet, 2.0Km to the North, is a densely populated residential area of Rolleston, has no records of odour complaints on opposing wind directions.
    d. Also, at this time of reviewing and assessing, it is not helpful to either the complainant residents nor to Council, when blame is instantly verbalised without the substantiating of the situation.

4. *"I want to be clear that I do not agree with your determination. The odour outside the drying room was extremely strong and offensive on the day I visited the site (although not a breach), and in my opinion the corresponding odour beyond the property boundary, although reduced was still strong at times and considered to be objectionable even if it was to only occur for short periods of time. This is a clear breach of Condition 3"*

    a. Similarly, Council does not agree with your determination and believes it's made in the absence of any evidence nor supporting validations.

5. *"Further to this, as **we did not undertake an odour assessment** at Trevor's house I do not **believe** we can be confident there was no odour at his property"*

    a. Then please explain, if you did not undertake an odour assessment at Trevor's house, how can you determine that an odour was present and that the Pines WwTP is not complaint as a result. Your statement is based on *quote* "believe" and not supported by factual evidence by your own statement.
    b. Although, as you are fully aware, Council has undertook odour assessments at Trevor's house recently, which did not produce the results that Trevor had hoped for, confirming that no odour was emanating from the Pines WwTP. Yet this is discounted by you.

It is timely to remind ourselves that, over the past few years, Council has repeatedly responded to many odour concerns raised by various ECAN officers, as the natural default has been to simply lay blame at the source being the Pines WwTP, only for Council's investigations to discover that over this period of time, many of those odour complaints (if not all TBH), can be directly attributed to a Global ECAN approved pig-effluent disposal consent holder discharging on nearby land.

Council is concerned at the same automatic association of blame for odours being labelled as from the Pines WwTP, when it is very evident that there are many, general and rural life practices surrounding this area and properties which give rise to odours.

Nevertheless, Council is committed to supporting its residents and has been communicating openly with them and working to resolve their concerns. We are planning to discuss these concerns further in an open-meeting early in the new year, which will be attended by their District Councillors.

G

Gareth Morgan
SERVICE DELIVERY MANAGER (INFRASTRUCTURE)

From: Trinity White <xxxxxxx.xxxxx@xxxx.xxxx.xx >
Sent: Monday, December 16, 2019 4:24 PM
To: Amit Chauhan; Murray England
Subject: CRC0401100.1 & CRC153952 Pines Visit - Substantiated Odour

Hello Amit and Murray,

Thank you for your email and your commitment to resolve any odour issues from the Pines.

During my site visit on Thursday (prior to substantiating the odour) yourself and Chris highlighted a number of measures undertaken by SDC and Sicon in an attempt to mitigate against any potential Pines WWTP odour sources. As discussed, at this time I was satisfied SDC and Sicon's response had been appropriate to date, particularly considering no odour had been substantiated. [1] However, now that odour has been substantiated beyond the property boundary from the Pines WWTP drying room, I consider an elevated response will be required. [2] Obviously you are now also non-compliant with Condition 3 of CRC040100.1 which states: *"The wastewater treatment and sludge drying operations shall not cause any odour or dust particles that are offensive or objectionable beyond the property boundary of the consent holder."* and therefore, actions will be required to address this non-compliance. Further detail will be provided in the compliance monitoring report, however in the meantime I would appreciate it if you could provide a breakdown of the measures undertaken to date.

Further to this, as discussed with yourself and Murray, [3] I have been receiving complaints from 5 different residents along Burnham Road. The residents are not happy with the response from SDC to date and would like SDC to engage with them regarding the operations at the plant and the odour. Obviously this is up to SDC to manage but in my opinion this would certainly help alleviate some of their frustration.

I note in your below email you refer to the odour as mild. [4] I want to be clear that I do not agree with your determination. The odour outside the drying room was extremely strong and offensive on the day I visited the site (although not a breach), and in my opinion the corresponding odour beyond the property boundary, although reduced was still strong at times and considered to be objectionable even if it was to only occur for short periods of time. This is a clear breach of Condition 3.

With regards to the bailage piles, as discussed at the time this was not the odour I was detecting beyond the property boundary. I am confident that the odour detected during my assessment was the same as that coming from the drying room, not from the bailage. 5. Further to this, as we did not undertake an odour assessment at Trevor's house I do not believe we can be confident there was no odour at his property.

I look forward to working with you both to resolve the odour issue at the Pines WWTP.

Kind regards,

Trinity

From: Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx >
Sent: Monday, 16 December 2019 1:45 PM
To: Trinity White <xxxxxxx.xxxxx@xxxx.xxxx.xx >
Subject: Pines Visit

Hi Trinity,

Thanks for your visit to Pines on Thursday. Appreciate your time and I think we had a good discussions on the general compliance conditions. Also, happy to note your perspective on the odour complaints around the areas surrounding Pines and that you were happy with the steps taken by our us in dealing with the odour complaints around the Burnham area.
As stated during the discussion, we at SDC consider all residents around our facilities as important stakeholders and are concerned about their comfort and well-being. We explained to you all the steps that we have taken to stick to the boundary odour conditions and collaborated with you to get an understanding of odour issues that has been concerning the residents around the Burnham Rd. In fact, as precautionary measure, we have
there was a mild but detectable whiff of o been keeping the solar dryer near empty and the operations under close vigil.
It was unfortunate that during the joint inspections, dour on a NE wind. I checked in our complaint register and had no complaints logged from any residents around the time when you logged the odour, and probably same on your side as the odour did not seem to be causing any annoyance. As you saw, there was also a freshly cut paddock and bailage piles in line of the wind direction that could have contributed to the noticeable whiff, however, the odour was restricted to a section of ~5-10m near property 195 on Burnham Rd, and to note, there was no odour at Trevor's place or any other place on Burnham Road.
We have done multiple inspections around the area and so have you to confirm that there has been no known odour issues related to Pines to cause any nuisance to the residents. However, we have taken note of this lead and have a plan to work on further improving the discharge to air related operations at the plant.
This odour whiff on small stretch of Burnham Rd, away from Trevor's place appears to be an isolated event and does not in any ways mean that Pines has been the cause of the odour complaints from the Burnham rd. residents as you suggested.
Trevor's place is located within an area of general farming practise and please note that there are many surrounding activities which will contribute to odour at times.
All in all, we can assure you that we are committed to and will continue to work on improving our operations to rule out any possibility of odour related or any other inconvenience to residents around Pines.

Thanks & kind regards

Amit Chauhan I **Water & Waste Water Engineer** I Selwyn District Council
DDI: 03 347 2848

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www.selwyn.getsready.net

Trinity White
Senior RMO Compliance Monitoring & Incident Response - Banks Peninsula Zone Delivery

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Trinity White
Senior RMO Compliance Monitoring & Incident Response - Banks Peninsula Zone Delivery

From: Trinity White
To: Amit Chauhan; Murray England
Subject: CRC0401100.1 & CRC153952 Pines Visit - Substantiated Odour
Date: Monday, 16 December 2019 4:24:00 PM

Hello Amit and Murray,

Thank you for your email and your commitment to resolve any odour issues from the Pines.

During my site visit on Thursday (prior to substantiating the odour) yourself and Chris highlighted a number of measures undertaken by SDC and Sicon in an attempt to mitigate against any potential Pines WWTP odour sources. As discussed, at this time I was satisfied SDC and Sicon's response had been appropriate to date, particularly considering no odour had been substantiated. However, now that odour has been substantiated beyond the property boundary from the Pines WWTP drying room, I consider an elevated response will be required. Obviously you are now also non-compliant with Condition 3 of CRC040100.1 which states: *"The wastewater treatment and sludge drying operations shall not cause any odour or dust particles that are offensive or objectionable beyond the property boundary of the consent holder."* and therefore, actions will be required to address this non-compliance. Further detail will be provided in the compliance monitoring report, however in the meantime I would appreciate it if you could provide a breakdown of the measures undertaken to date.

Further to this, as discussed with yourself and Murray, I have been receiving complaints from 5 different residents along Burnham Road. Tthe residents are not happy with the response from SDC to date and would like SDC to engage with them regarding the operations at the plant and the odour. Obviously this is up to SDC to manage but in my opinion this would certainly help alleviate some of their frustration.

I note in your below email you refer to the odour as mild. I want to be clear that I do not agree with your determination. The odour outside the drying room was extremely strong and offensive on the day I visited the site (although not a breach), and in my opinion the corresponding odour beyond the property boundary, although reduced was still strong at times and considered to be objectionable even if it was to only occur for short periods of time. This is a clear breach of Condition 3.

With regards to the bailage piles, as discussed at the time this was not the odour I was detecting beyond the property boundary. I am confident that the odour detected during my assessment was the same as that coming from the drying room, not from the bailage. Further to this, as we did not undertake an odour assessment at Trevors house I do not believe we can be confident there was no odour at his property.

I look forward to working with you both to resolve the odour issue at the Pines WWTP.

Kind regards,

Trinity

From: Amit Chauhan <xxxx.xxxxxxx@xxxxxx.xxxx.xx>
Sent: Monday, 16 December 2019 1:45 PM
To: Trinity White <xxxxxxx.xxxxx@xxxx.xxxx.xx>
Subject: Pines Visit

Hi Trinity,

Thanks for your visit to Pines on Thursday. Appreciate your time and I think we had a good discussions on the general compliance conditions. Also, happy to note your perspective on the odour complaints around the areas surrounding Pines and that you were happy with the steps taken by our us in dealing with the odour complaints around the Burnham area.
As stated during the discussion, we at SDC consider all residents around our facilities as important stakeholders and are concerned about their comfort and well-being. We explained to you all the steps that we have taken to stick to the boundary odour conditions and collaborated with you to get an understanding of odour issues that has been concerning the residents around the Burnham Rd. In fact, as precautionary measure, we have
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We have done multiple inspections around the area and so have you to confirm that there has been no known odour issues related to Pines to cause any nuisance to the residents. However, we have taken note of this lead and have a plan to work on further improving the discharge to air related operations at the plant.
This odour whiff on small stretch of Burnham Rd, away from Trevor's place appears to be an isolated event and does not in any ways mean that Pines has been the cause of the odour complaints from the Burnham rd. residents as you suggested.
Trevor's place is located within an area of general farming practise and please note that there are many surrounding activities which will contribute to odour at times.
All in all, we can assure you that we are committed to and will continue to work on improving our operations to rule out any possibility of odour related or any other inconvenience to residents around Pines.

Thanks & kind regards
Amit Chauhan I Water & Waste Water Engineer I Selwyn District Council
DDI: 03 347 2848

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From: Murray Washington
To: Lillian Sewell
Cc: Gareth Morgan; Stephen Hill
Subject: FW: Effluent Discharge onto SDC Pines Land
Date: Tuesday, 30 June 2020 7:22:07 AM

Lillian

for your information

regards

Murray Washington

From: Ian Shaw [mailto:x.xxxx@xxxxxxxxxxxxx.xx.xx]
Sent: Thursday, 8 November 2018 5:46 PM
To: 'Trinity White' <xxxxxxx.xxxxx@xxxx.xxxx.xx>; Gareth Morgan <xxxxxx.xxxxxx@xxxxxx.xxxx.xx>
Cc: Murray Washington <xxxxxx.xxxxxxxxxx@xxxxxx.xxxx.xx>; Murray England <xxxxxx.xxxxxxx@xxxxxx.xxxx.xx>; Tim Harris <xxx.xxxxxx@xxxxxx.xxxx.xx>; Billy Charlton <xxxxx.xxxxxxxx@xxxxxx.xxxx.xx>; Rob Turner <x.xxxxxx@xxxxxxxxxxxxx.xx.xx>; Matt Willoughby <xxxx.xxxxxxxxxx@xxxx.xxxxxx.xx>; xxxxxx.xxxxx@xxxx.xxxxxx.xx; xxxxx.xxxxxx@xxxx.xxxxxx.xx
Subject: Effluent Discharge onto SDC Pines Land

Hi Trinity and Gareth

I wish to confirm my discussions with Trinity this morning concerning the situation in respect of the raw effluent discharge on Fri 02 Nov onto one of the Pines Sewage Treatment Plant paddocks immediately upstream of two test bores.

1. The discharge on Fri o2 Nov was observed by Food and Health Standards, SDC water monitoring contractor.
2. Site assessment was made by SDC Senior Environmental Health Officer on Sat 03 Nov.
3. Ian Shaw sent advice of the discharge to Gareth Morgan on Sat 03 and met with him on Mon 05 Nov. Concern was expressed by Gareth and Ian. It was

established that SDC were not aware of this practice being undertaken on the paddock being used to spread the raw effluent, ie., immediately upstream of the Council's Pines monitoring bores which have experienced elevated test results for nitrates.

4. Gareth commenced an investigation into the matter immediately and organised to meet the manager of Sicon-Ferguson at the Pines Sewage Treatment Plant. It was determined that the people that have been spreading the raw effluent have been doing this for a period of time (yet to be confirmed).
5. Gareth took immediate action to cease the raw effluent discharges on the Council land in question and is continuing his enquiries with Sicon-Ferguson

<u>The Wider Picture in the Burnham Area in Respect of Public Health</u>

1. **The recent Defence Force failure of one of the monitoring bores and potential adverse effects to aquifers and private drinking water supplies downstream of the DF Sewage Plant. ECan served an abatement notice pursuant to the RMA however, this was challenged by the DF legal advisors and has been lifted. It is subject to monitoring conditions which are being discussed with the SDC SEHO, CPH and ECan.**
2. **Potential adverse effects to private bores downstream of the Pines effluent disposal fields. There has been an infectious disease notification associated with a property on Burnham School Road. The possible source is the supply tank on that property.**
3. **A number of private bore water sources in the area are likely to be contaminated. Potentially affected properties have been notified to boil water in the interim.**
4. **The Piggery on Burnham Road has raw effluent discharges in the area on a number of properties that are causing actual and potential health concerns, ie., odour complaints, airborne contamination, ground water contamination. The piggery and Robson Environmental are causing the issues.**

Ian Shaw/Rob Turner and Trinity White have and are continuing to work closely together to complete their investigations and actions. Trinity is researching effluent discharge consents and consents relating to the Piggery. Both are working on resolving the Defence Force discharges and Piggery.

Trinity has indicated that ECan will be pursuing the Piggery and Robson for breaches of consents, including using SDC land that is not part of their consent.

Ian/Rob/CPH/ECan are meeting next week to discuss the entire area and what actions will be necessary.

Trinity/Ian/Gareth/Amit and any other key SDC person will meet next week to discuss the Pines operations, ie., the effluent disposal.

Ian/Rob will review Robson Environmental Offensive Trades Licence pursuant to the Health Act 1956.

Subject to further discussion with SDC Environmental Health Services, Ian/Rob will re-visit all potentially affected properties to ensure that their water supplies are compliant and suitable treatment systems are installed where necessary.

Ian has had a brief discussion with Vanessa Beavon, SDC Building Manager and is meeting with her on Tues 13 Nov to discuss potential non-compliances with the Building Act with respect to self-supplies used for drinking, domestic purposes and food preparation. This is in case SDC deems it necessary to take a formal action approach. We are hoping this will not be the case.

This email provides a broad-spectrum of the situation that has been manifesting in this area south east and south east and south west of SHW 1, Burnham.

All relevant authorities are working together to ensure effective mitigation now and for the future.

Regards
Ian

Selwyn DISTRICT COUNCIL

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From: Murray Washington
To: Lillian Sewell
Cc: Gareth Morgan; Stephen Hill
Subject: FW: Pines WwTP | Walk-Over & Nearby Residents Meeting | Odour Complaints
Date: Tuesday, 30 June 2020 7:19:50 AM
Attachments: RE Disposal.msg

Lilian for your information

regards

Murray

From: Gareth Morgan
Sent: Tuesday, 30 June 2020 7:05 AM
To: Murray Washington <xx@xxx
Subject: FW: Pines WwTP | Walk-Over & Nearby Residents Meeting | Odour Complaints

Two very key elements of information relating to the Pines WwTP here Murray,

1. Discussions with Trinity outlining actions taken by SDC in response to public Q's and refuting the source of the odour and,
2. In Nov18 it was disclosed and then investigated by ECAN (Jana), Robsons were discovered discharging Pig-Effluent over the irrigation paddocks and had done unknowingly to SDC since 2009. This was believed to be the source of the elevated nitrate levels (discharge occurred over sample points) and frequent odour issues.

G

From: Trinity White [mailto:xx@xxx]
Sent: Friday, 13 March 2020 8:38 AM
To: Gareth Morgan <xx@xxx>
Cc: Amit Chauhan <xx@xxx>

Subject: RE: Pines WwTP | Walk-Over & Nearby Residents Meeting | Odour Complaints

Good morning Gareth,

Thank you for your update. It certainly sounds like this was a worthwhile exercise.

Great work from SDC

Kind regards,

Trinity

From: Gareth Morgan
Sent: Thursday, 12 March 2020 10:20 AM
To: Trinity White
Cc: Amit Chauhan
Subject: FW: Pines WwTP | Walk-Over & Nearby Residents Meeting | Odour Complaints

Trinity,

We should probably update you on where we have got to with the group of BHM Residents who believed that odour experiences at their residences was originating at the Pines WwTP.

We have been talking with the group since the NY and yesterday, we invited and arranged for them to be shown around the Pines WwTP by Sicon and Council. They were also accompanied by the Mayor and two Councillors.

We spoke openly to them and received positive feedback for the visit.

Whilst we do not agree that all of their experiences were arising at the Pines WwTP, we wanted to build a positive and open relationship with the Group, showing them how the Plant operated and allowing them to see the operations first-hand. We concluded the visit with a Q&A session with them and agreed that, we'd establish an early-warning email notification Group to advise of any operating challenges if/ever they arose, which we have already done this morning. All in all, a well-received initiative.

Happy to talk through this a bit further when you're next available Trinity but just an update.

G

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From: Amit Chauhan
To: Trinity White
Subject: RE: CRC155937 - Pines odour complaints
Date: Thursday, 7 November 2019 10:48:46 AM

Hi Trinity,

Thanks for sharing the information. All these complaints were lodges in our AMS system and followed up by the WW operators. Stu was in touch with the owners.

All our investigations around these complaints suggest that the odour was not from Pines treatment plant.

As informed, we met the owners who complained about the odour issues and informed them about the investigations.

We have also installed the odour loggers in their property which will hopefully give a better understanding of the problem.

We will keep you posted.

Kind regards

Amit

From: Trinity White [mailto:xx@xx]
Sent: Tuesday, 5 November 2019 7:56 AM
To: Amit Chauhan <xx@xx>
Subject: CRC155937 - Pines odour complaints

Hello Amit,

I have received several complaints over the past week in relation to odour from the Pines. Mr Tiplady has been logging his complaints with SDC via the Snap

Send Solve App, and is frustrated he is not receiving any response from SDC in regards to these complaints.

According to [redacted], the odour is almost always occurring over the weekend. Can you please find out where these Snap Send Solve complaints are being directed at SDC and ensure the appropriate people are being notified (i.e. yourself and someone on site at Sicon during the weekend). [redacted] would also appreciate a call from you to discuss further. He can be contacted on [redacted]

Kind regards,

Trinity

Trinity White
Senior RMO - Compliance Monitoring - Selwyn Waihora
Environment Canterbury
Christchurch Office

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

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From: Ian Shaw Food & Health
To: Jana Hayes
Cc: Trinity White; Rob Turner; Gareth Morgan
Subject: RE: Disposal
Date: Monday, 26 November 2018 9:15:11 AM
Attachments: image001.png

Morning Jana
The effluent disposal activity was observed on Friday 02 Nov (late afternoon), by Liane Burt, Sampling Officer, Food and Health Standards (2006) Ltd for SDC Pines monitoring programme. Liane notified Lisa Shaw, team Leader Water Monitoring Programmes, Food and Health Standards (2006) Ltd straight away from the site, which was Pines Bore BX23/0206. Lisa Shaw notified me straight away. I then sent an email at 6.02pm on Fri 02 Nov to Gareth Morgan, Cinnil Thomas and Amid Chauhan at SDC advising them of the effluent disposal incident.
The odour onsite was described as purid. The Robson truck was not onsite for very long at all. It was a disposal around the perimeter of the paddock where the bore BX23/0206 is located.
I received a response from Gareth Morgan on Sat 03 Nov stating that the matter is serious. Council took an immediate action to commence an investigation.
On Sat 03 Nov I organised to visit the Pines paddock in question and undertook an assessment. I observed numerous truck tracks across the paddock, including the tracks of the Friday 02 Nov incident. There was still a stench of strong raw effluent emanating from the paddock. It was a very hot sunny day with a very slight breeze. I took numerous photos and videos which I will send to you now.
Gareth Morgan and communicated further on Mon 05 Nov. Gareth had taken an immediate action to cease the effluent disposal activity. This action was complied with straight away.
We do have environmental health concerns in this area as discussed and would appreciate ongoing communication with you regarding any adverse health affects via contaminated aquifers down stream of the Pine effluent disposal fields and farmland. Receipt of Robson Environmental's disposal details/returns will be useful for SDC in respect of Robson's registration as an Offensive Trade pursuant to the Health Act 1956.
I hope this assists.
Regards
Ian

Ian Shaw
Enforcement Officer, Resource Management Act 1991
Senior Environmental Health Officer
Selwyn District Council

Managing Director
Food & Health Standards (2006) Ltd
Building Management Services
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E | x.xxxx@xxxxxxxxxxxxx.xx.xx

From: Jana Hayes
Sent: Friday, 23 November 2018 5:14 PM
To: Ian Shaw ; Gareth Morgan
Subject: RE: Disposal

Afternoon Ian,
I'd like to get this memo completed next week to take to EDP before Christmas (we only have EPD fortnightly). Could you please send all the evidence you have COB Monday so I can work on it and continue my investigation?
Also, what exact date was Robsons seen on site? And when was SDC made aware of the issue? I need this for my EDP memo.
Jana

From: Jana Hayes
Sent: Thursday, 22 November 2018 12:35 PM
To: 'Ian Shaw' <x.xxxx@xxxxxxxxxxxxx.xx.xx>; Gareth Morgan <xxxxxx.xxxxxx@xxxxxx.xxxx.xx>
Subject: FW: Disposal

Morning Ian, Gareth
Thank you for your time yesterday, it was good to sit down and meet you both, and discus this issue.
I've attached the discharge records from Robsons that they sent me last week.
I've spoken to Keiran Robson (co-owner / operator) to let him know about the investigation. I've also reiterated again that they need to get written permission

from land **owners** not leases, and taken the opportunity to discuss the setback from bores. Keiran is aware of the condition stating only bores used for water abstraction, but I have told him that the discharge has potential to still enter groundwater through other bores and they need to be aware of this and discharge accordingly.
I have also attached the S42a report which was completed as part of this consent.
This application was resubmitted, and as a result two emails have been sent out requesting feedback from affected parties. SDC was included in both emails. I note the email went to xxxxxxxx.xxxx@xxxxxx.xxxx.xx and not to a direct person. Is this inbox monitored frequently? The first email was sent on 10/10/2017 and the resubmission email was sent on the 28/11/2017.
If you have any questions, or anything to add, please let me know
Could you please send any evidence that you have gathered?
Kind regards,
Jana Hayes

From: Robsons / Charlies Takeaways [redacted]z>
Sent: Tuesday, 13 November 2018 12:37 PM
To: Jana Hayes <xxxx.xxxxx@xxxx.xxxx.xx>
Subject: Disposal

Hi Jana,

Keiran Robson has asked the attached to be emailed to yourself.

Kind Regards,

[redacted]

Robson Environmental Services Ltd
Charlies Takeaways Rakaia
Phone: ([redacted]
Email: [redacted]
[redacted].co.nz