Seddon Sewage Treatment Plant Consent Compliance Report 1 July 2018 - 30 June 2019

Prepared for Marlborough District Council
Prepared by Beca Limited

10 October 2019

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Contents

Appendices

Revision History

Revision Nº	Prepared By	Description	Date
A	Kevin Joeng	Draft for Client Review	27/09/2019
B	Kevin Joeng	Final (updated with MDC comments)	10/10/2019

Document Acceptance

Action	Name	Signed	Date
Prepared by	Kevin Joeng		10/10/2019
Reviewed by	Sarah Burgess		10/10/2019
Approved by	Graeme Jenner		10/10/2019
on behalf of	Beca Limited		

Consent Compliance Summary

Condition	Requirement	Observation	Compliance Status
2: Maximum Discharge	Maximum discharge of 570m^3/d averaged over a week to Starborough Creek.	Maximum average discharge of 278.7m^3/d recorded.	Met
3: Weekly Flow Readings	Daily recording of discharge volumes	Discharge volumes recorded daily.	Met
4: Outfall Effects	No outfall effects must be observed within 300m of the mixing zone.	No outfall effects observed	Met
6: Dissolved Oxygen & pH at Pond 6 Outlet	DO and pH readings taken weekly. DO should not show a declining trend.	Readings taken weekly (average every 7.202 days). No declining trend.	Met
7: Pond 6 Outlet Grab Sampling	Grab sampling must be carried out every three months at the outlet of pond 6. Samples must be tested for the requested parameters.	Grab samples taken at the required frequency. Appropriate analyses carried out on samples.	Met
8 & 9: Operation & Management Plan	Creation of an Operation & Management Plan. STP must be operated according to this plan.	Operation & Management Plan available (dated February 2019), and adhered to.	Met
10: Receiving Environment Monitoring	Grab sampling every three months downstream and upstream of Starborough Creek. Samples tested for the required analyses.	Grab samples taken at specified locations at required frequency. Most analytes tested for. Insignificant effects observed downstream of STP.	Partial Compliance
11 & 12: Dissolved Oxygen	DO must be continuously monitored for two 7-day periods during summer. The minimum DO concentrations per day and averaged per week shall be assessed.	DO was monitored continuously over two 7-day periods during summer. DO concentrations were compliant with the requirements of Condition 12. No remedial action required.	Met
14: Ecological Assessment	-		Not required yet
15 & 16: Reporting	Annual reporting of Conditions 7, 10 -11.	Fulfilled by submission of this report.	Met
17: Land Disposal Investigations	Updates on land disposal investigations must be provided to the Council & Te Rūnanga o Kaikōura.	Updated 22 August 2019. Outside of required reporting period, but appropriate given the recent granting of the consent.	Met
18: Resource Consent Application	New resource consent application must be lodged for land disposal.	Land disposal option not investigated yet.	Met
19: Warning Sign	Sign must be visible to warn of effluent discharge.	Sign visible at correct location.	Met
20: Structural Condition	Structural condition of works under consent must satisfy Council requirements.	No works need carrying out.	Met
21 & 22: Incidents	Recording of incidents at the STP.	No incidents occurred at STP during monitoring period.	Met

Condition	Requirement	Observation	Compliance Status
23: Discharges to Air	Recording of work at STP which may cause temporary discharge of additional contaminants to air.	No works carried out at STP causing discharge of contaminants to air during monitoring period.	Met
24, 25 & 26: Complaints Register	Maintaining of complaints register for STP.	No new complaints registered during monitoring period.	Met

1 Introduction

The Seddon Sewage Treatment Plant (STP) collects and treats all of the domestic wastewater from the Seddon Township. At the STP, wastewater is treated in two ponds: a 6,800 m^3 facultative pond and a 3,220 m^3 maturation pond. In 1997, significant upgrades were carried out at the STP to increase the treatment process efficiency. These upgrades consisted of desludging the ponds, installing a low permeability clay liner and subdividing the tertiary pond into a series of five ponds. Marlborough District Council is responsible for operating the Seddon STP.

Treated effluent is discharged into Starborough Creek, a tributary of the Awatere River. The Starborough Creek runs through a narrow, high-sided valley before emerging on the gravel flats of the Awatere River. See **Appendix A** for a map showing the oxidation pond and sampling locations in the river.

MDC held discharge Consent U060927, which allowed for the discharge of up to 750 m^3/day of treated wastewater to the Starborough Creek. This consent has since expired (on 31 July 2017), and has been replaced by Consent U170260 as of 24 May 2018. This will be the first annual monitoring submitted under Consent U170260. A copy of Consent U170260 is attached in **Appendix B.**

The intention of this report is to summarise and provide an interpretation of the monitoring data collected from the STP under the requirements of Consent U170260 between 1 July 2018 and 30 June 2019.

Only consent conditions that have numerical or qualitative monitoring requirements are assessed. For clarity, consent conditions are quoted in *italics*.

2 Consent Conditions

2.1 Consent Purpose

Consent U170260 allows for the discharge of up to 570 m^3/day from the Seddon STP to Starborough Creek.

2.2 Condition 2 – Maximum Discharge

The discharge shall not exceed 570 cubic meters per day (average over any one week) of treated wastewater from the Seddon Sewage Treatment Plant.

Table 2-1 shows the discharge flow monitoring results for the STP for the current consent compliance monitoring period, as well as the past eight years. The maximum daily discharge measured during the monitoring period was 426m^3/d, occurring on 28 November 2018. The maximum daily discharge averaged over a week was 278.7m^3/d, recorded between 26 November 2018 and 2 December 2018. Therefore, the 570m^3/d limit was not exceeded and compliance with the requirements of Condition 2 was achieved. Daily discharge readings for this monitoring period are shown in **Appendix C**.

The average daily discharge for the 2018/19 monitoring period was 1.4m^3/d lower than the 2017/2018 figure, but still remains at least 11m^3/d higher than the other years' average daily flows. Average daily flows have increased significantly since 2011/12.

Table 2-1 Average daily discharge flow rates

Year (1 July – 30 June)	Average Daily Discharge (m^3/day)	Maximum Daily Discharge (m^3/day)
2010/2011	48.1	334.0 on 24 July 2010
2011/2012	38.6	365.5 on 22 March 2012
2012/2013	95.0	385.6 on 21 April 2013
2013/2014	75.7	414.6 on 29 November 2013
2014/2015*	72.5	376.4 on 4 June 2015
2015/2016	88.0	381.6 on 23 September 2015
2016/2017	98.0	351.0 on 13 April 2017
2017/2018	111.1	452.4 on 13 June 2018
2018/2019	109.7	426.0 on 28 November 2018

*Accurate flow data for 1 July – 5 September 2014 was not available due to grape vine wrappers blocking the flow meter.

2.3 Condition 3 – Weekly Flow Readings

The consent holder shall measure the volume of wastewater discharged to Starborough Creek on a daily basis. The results shall be provided to the District Council as part of the reporting required under Condition 16 or on request.

Volumes of wastewater discharged to Starborough Creek were recorded daily throughout the monitoring period. This data can be found in **Appendix C**.

2.4 Condition 4 – Outfall Effects

The discharge of treated wastewater through the outfall shall not cause any of the following effects outside of the 300 metre mixing zone:

a) A change in the temperature of the receiving water of more than 3 degrees Celsius.

b) *Any significant adverse effects on aquatic life as assessed by the survey required by Condition 14 of this consent.*

c) *There shall be no production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials.*

None of the effects described above were observed during the 2018/19 monitoring period.

2.5 Condition 6 – Dissolved Oxygen and pH

The consent holder shall have a suitably trained person take weekly Dissolved Oxygen and pH readings at the outlet of Pond 6. If the weekly Dissolved Oxygen readings identify that there is a declining trend in Dissolved Oxygen (for samples taken between 11am and 2pm), then the consent holder shall take best practicable measures to improve these Dissolved Oxygen concentrations. Best practicable measures may include, but shall not be limited to, the measures identified in the Council's Operation and Management Plan required under condition 8.

Fifty-one dissolved oxygen and pH readings were taken at the outlet of Pond 6 throughout the monitoring period. The average interval between readings was 7.202 days. The longest interval between readings was 18.104 days, occurring between 21 December 2018 and 8 January 2019. The median time of day that readings were taken was 11:50 AM.

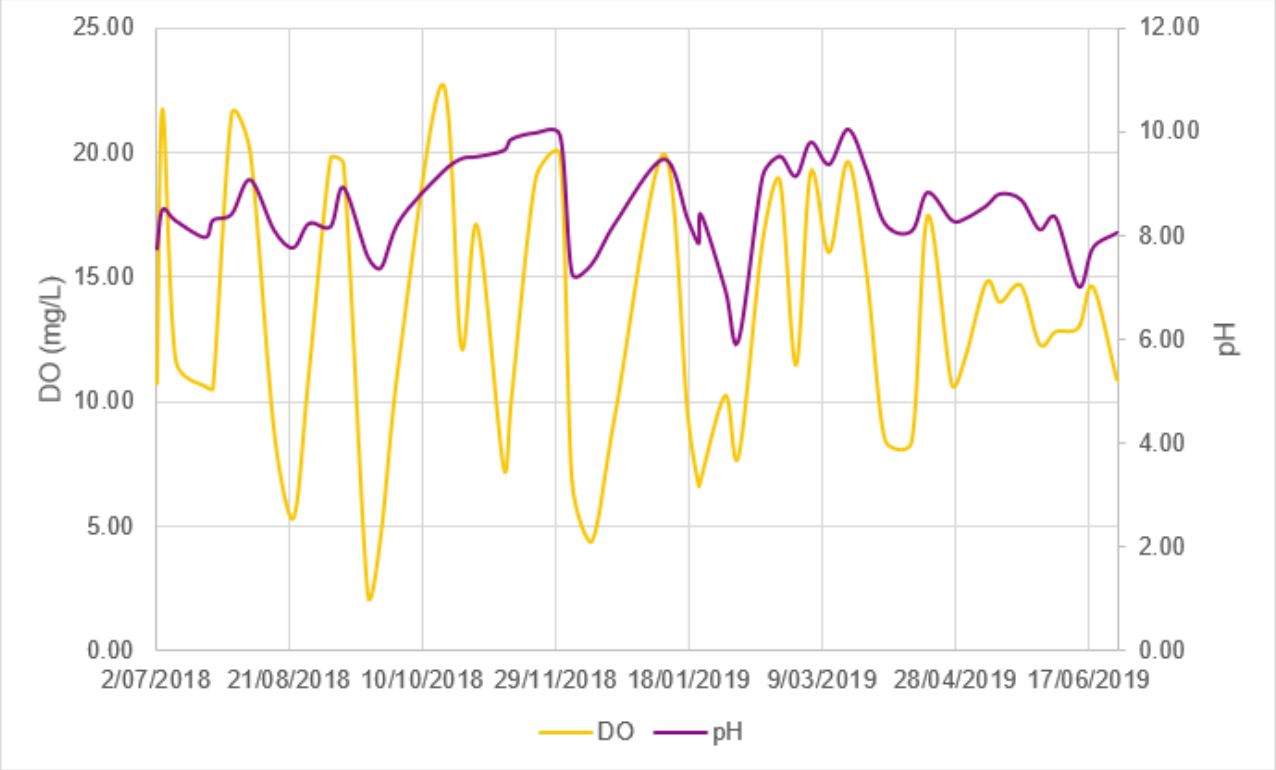

Figure 2-1 Dissolved oxygen concentrations and pH at outlet of Pond 6

Low dissolved oxygen concentrations can be an indication of poor pond health and generation of nuisance odour. Dissolved oxygen concentrations ranged from 2.37 mg/L to 22.70 mg/L throughout the monitoring period, and average at 12.95 mg/L. From Figure 2-1, it can be seen that the dissolved oxygen concentrations fluctuate diurnally and throughout the year. Daily fluctuations occur in response to sunlight and algal photosynthesis. Seasonal variations occur due to such factors as pond temperature and stormwater inflows. These fluctuations were less notable in May and June 2019. However, no declining trend was observed in the data and therefore no immediate action is required.

pH readings ranged between 5.98 and 10.05, with an average of 8.50 for the monitoring period. This range is typical for pond systems with longer retention times. Diurnal variations in pond pH occur in response to changes in the amount of algal photosynthesis. At night, the algae generate carbon dioxide that can significantly raise the alkalinity.

2.6 Condition 7 – Pond 6 Outlet Grab Sampling

The consent holder shall take grab samples of the wastewater from the outlet of Pond 6 every three months and analyse the samples for the following:

a) Biochemical oxygen demand

b) Total suspended solids

c) Conductivity

d) Total nitrogen

e) Ammonia-Nitrogen

f) Total phosphorous

g) Dissolved reactive phosphorous

h) E. Coli

i) Faecal Coliforms

j) Dissolved Oxygen

k) Temperature

l) pH

Table 2-2 summarises the results of analysis of the Pond 6 outlet samples. Samples were collected approximately every 3 months, complying with the required frequency in Condition 7. Note that the last sample from the previous monitoring period was taken on 16 April 2018, which is 2 months and 16 days before the first sample of this monitoring period. All the analyses required by Condition 7 were carried out on the samples.

Table 2-2 Results of sampling from Pond 6 outlet

	2 July 2018	17 October 2018	22 January 2019	26 April 2019
BOD-5 (g O_2/m^3)	22	28	18	22
Total Suspended Solids (mg/L)	19	109	90	55
Conductivity (µS/cm)	745	548	587	520
Total nitrogen (24hr) (g/m^3)	42	33	22	25
Ammoniacal-Nitrogen (mg/L)	36	13.3	7.1	16.5
Total Phosphorous (g/m^3)	7.2	6.6	6.9	4.4
Dissolved Reactive Phosphorous (mg/L)	6	4.3	4.6	3.3
E. Coli (number/100mL)	540	45	1600	1600

	2 July 2018	17 October 2018	22 January 2019	26 April 2019
Faecal Coliforms (cfu/100mL)	540	45	1600	1600
Dissolved Oxygen (mg/L)	10.72	22.7	6.96	10.73
Temperature (°C)	8.3	17.4	20.3	15.5
pH	7.74	9.22	8.39	8.29
Duration from previous sample	2 Months, 16 Days	3 Months, 15 Days	3 Months, 5 Days	3 Months, 4 Days

2.7 Condition 8 & 9 – Operation and Management Plan

Condition 8:

The consent holder shall prepare and submit an Operation and Management Plan (OMP) to the Council's Compliance Manager within two months of commencement of the consent. The objective of the OMP is to ensure that the operation and management of the Seddon Sewage Treatment Plant complies with the conditions of the resource consent. The OMP shall document all relevant site management monitoring and operational procedures and contingency plans.

Condition 9:

The consent holder shall operate the Seddon Sewage Treatment Plant in accordance with the OMP (including any new version of, or amendment to the OMP). The consent holder shall ensure that any amendments to the OMP, or new versions of the OMP are provided to the Council's Compliance Manager.

An OMP, dated February 2019, containing all relevant site monitoring and operational procedures and contingency plans was prepared (see **Attachment D**).

MDC continues to operate the Seddon STP in accordance to the OMP dated February 2019.

2.8 Condition 10 – Receiving Environment Monitoring

The consent holder shall carry out a programme of receiving environment monitoring for the duration of the consent as follows:

a) Water samples shall be taken by a suitable trained person on a three-monthly basis at the following locations:

i. Upstream: where State Highway 1 crosses Starborough Creek

ii. Downstream: approximately 300m of the discharge point (or as close to that point as practical taking into account the ephemeral nature of Starborough Creek)

b) Samples shall be analysed for:

i. Total biochemical oxygen demand

ii. Total suspended solids

iii. Conductivity

iv. Nitrate

v. Total nitrogen

vi. Ammonia

vii. Ammoniacal nitrogen

viii. Dissolved inorganic nitrogen

ix. Total phosphorous

x. Dissolved reactive phosphorous

xi. E. Coli

xii. Faecal coliforms

xiii. Dissolved oxygen (samples to be taken between 9.30am – 2.30pm)

xiv. Temperature

xv. *pH*

c) The concentration of Dissolved-Oxygen in the downstream receiving water shall not drop below 6mg/L unless upstream is less than 6mg/L. If the concentration of dissolved oxygen is below 6mg/L, then the consent holder shall take the actions set out at condition 13.

d) If the downstream concentration of Dissolved Oxygen is below 4mg/L, then the consent holder shall take the actions identified at condition 13, regardless of what the upstream concentration is.

Table 2-3 below summarises the monitoring data at the receiving environment. The sampling frequency meets the requirements of Condition 10.

Table 2-3 Starborough Creek sampling results

	2 July 2018		17 October 2018		22 January 2019		26 April 2019	
Parameter	U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S
BOD-5 (g O_2/m^3)	2	2	2	6	2	2	2	4
Total Suspended Solids (mg/L)	7	8	7	9	3	4	3	28
Conductivity (µS/cm)	745	758	967	938	943	961	973	947
Nitrate - Nitrogen (mg/L)	10.3	9.6	11	9.1	9.3	7.9	5.6	3.6
Total Kjeldahl Nitrogen (mg/L)	0.64	1.11	0.75	2.3	0.78	1	0.77	2.7
Ammonia[1](mg/L)	0.012	0.44	0.023	0.40	0.012	0.064	0.019	1.11
Ammoniacal-Nitrogen (mg/L)	0.01	0.36	0.019	0.33	0.01	0.053	0.016	0.91
Dissolved inorganic nitrogen (mg/L)	10.3	10	11	9.7	9.3	8	5.7	4.8
Total Nitrogen[2] (mg/L)	10.9	10.8	11.7	11.7	10.1	8.9	6.5	6.6
Total Phosphorous (mg/L)	0.090	0.178	0.043	0.53	0.029	0.186	0.030	0.57
Dissolved Reactive Phosphorous (mg/L)	0.035	0.105	0.0118	0.35	0.014	0.136	0.015	0.410

	2 July 2018		17 October 2018		22 January 2019		26 April 2019	
Parameter	U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S
E. Coli (number/100mL)	79	27	22	240	240	170	240	79
Faecal Coliforms (cfu/100mL)	79	79	22	240	240	170	240	130
Dissolved Oxygen (mg/L)	11.78	10.29	7.95	7.46	4.44	5.03	9.29	7.32
Temperature (°C)	7.9	8	13.2	13.1	19	19.3	13.5	15.3
pH	8	8.1	8.1	8.1	8.1	8.1	7.8	7.7
Duration from previous sample	2 months, 16 days		3 months, 15 days		3 months, 5 days		3 months, 4 days	

Notes:

1. Ammonia concentration was estimated from the recorded Ammoniacal Nitrogen value.
2. Total Nitrogen was not analysed, but an estimate has been made by adding together total Kjeldahl nitrogen (TKN) and dissolved inorganic nitrogen (DIN) then subtracting ammoniacal nitrogen as it is included in both TKN and DIN.

Dissolved oxygen concentration at the downstream receiving water dropped below 6mg/L on 22 January 2019, but the upstream concentration was also below 6mg/L. The downstream concentration of dissolved oxygen was not below the 4mg/L threshold, so the actions set out in Condition 13 were not triggered. However, MDC still carried out the remedial actions, as discussed in Section 2.9.

From Table 2-3, it can be seen that:

- There were no significant differences between upstream and downstream samples observed for BOD_5, conductivity, dissolved oxygen concentration, temperature and pH.
- There were only minor increases in total suspended solids of ~1mg/L downstream of the STP, except for the 26 April 2019 sample, where an increase of 25 mg/L was observed.
- Nitrate nitrogen decreased downstream of the STP by up to 2mg/L.
- TKN increased by between 0.22 and 1.93 mg/L downstream of the STP.
- Ammoniacal nitrogen increased by between 0.05 and 0.9 mg/L downstream of the STP.
- Total phosphorous and total dissolved reactive phosphorous concentrations increased by up to 0.54 mg/L downstream of the STP.
- E.Coli and Faecal Coliforms decreased downstream of the STP for 3 of the four samples, which is unexpected. Only the sample from 17 October showed an increase in E. Coli and Faecal Coliforms at the downstream site.

From the above summary, it seems that while nutrients and ammonia concentrations were higher at the downstream site, other parameters such as BOD, TSS and micro-organisms were lower. While Consent U170260 does not set limits for the concentration of analytes in the receiving waters, from the results of sampling in 2018-19, the discharge of wastewater does not appear to have had an overall measurable significant impact on the water quality of Starborough Stream.

2.9 Condition 11 & 12 – Dissolved Oxygen

Condition 11:

Dissolved Oxygen shall be measured continuously by a suitably trained person (using a Dissolved Oxygen logger) at the upstream and downstream locations specified in condition 10(a) for two separate periods of seven days each summer for the term of the consent. The weekly measurements shall be undertaken when flows are low to determine the Dissolved Oxygen 7-day mean minimum and the 1-day minimum.

Condition 12:

Based on the continuous monitoring data collected under condition 11:

a) *if the 7-day mean dissolved oxygen minimum at the downstream site is below 6mg/L, or the 1-day dissolved oxygen minimum is below 5mg/L, the consent holder shall take the actions identified at condition 13 unless upstream is also below those concentrations; or*

b) *if the downstream Dissolved Oxygen concentration is below 5mg/L for the 7-day mean Dissolved Oxygen minimum, or 4mg/L for the 1-day Dissolved Oxygen minimum, the consent holder shall take the actions identified at condition 13 regardless of the upstream concentration.*

Dissolved oxygen concentrations were continuously measured from the specified upstream and downstream locations for two separate periods of seven days during the summer of 2018/19, during periods of low flow. Measurements were taken every two minutes. Results from the data collected are presented in Table 2-4.

Table 2-4 Dissolved oxygen minimum concentrations from Summer 2018/19 (mg/L)

	Week Starting 15/1/2019	Week Starting 27/2/2019
U/S 7-day mean minimum	6.988	5.707
U/S 1-day minimum	5.84	4.81
D/S 7-day mean minimum	7.317	5.363
D/S 1-day minimum	6.8	4.39

For the week commencing the 27th February 2019, the downstream 7-day mean dissolved oxygen minimum was below 6mg/L, and the 1-day dissolved oxygen minimum was below 5 mg/L. However, as the results were not below the limits in Condition 12(b), and the upstream values were also below these thresholds, the requirement to undertake the actions identified at Condition 13 was not triggered. Therefore, the requirements of Condition 12 have been met. However, MDC did carry out additional continuous logging as discussed below.

2.10 Condition 13 – Dissolved Oxygen

If Dissolved Oxygen concentrations are below the limits identified in conditions 10(c), 10(d) and 12, then the consent holder shall:

a) *At the outlet of Pond 6 either:*

   i. *Take spot measurements of Dissolved Oxygen during the day and at dawn; or*

   ii. *Operate a continuous logger;*

   over a period of 72 hours to determine the daily Dissolved Oxygen minimum;

b) *If the daily Dissolved Oxygen minimum identifies that Dissolved Oxygen at the outlet of Pond 6 falls below 5mg/L at any time during the 72-hour period, then the consent holder shall as soon as possible:*

   i. *take best practicable measures, which may include, but are not limited to, an aerator or recirculation of water from pond 6 to pond 5, to improve the Dissolved Oxygen concentration in Pond 6; and*

ii. at the same time the best practicable measures are being implemented, continuously log Dissolved Oxygen at the downstream site specified at condition 10(a)(ii) and at the outlet of Pond 6 over a minimum of 72 hours to confirm whether there is an improvement in the Dissolved Oxygen concentration.

c) The results of the retesting shall be provided to the Council as part of the annual written monitoring report under condition 16 along with a summary by a suitably qualified person of the efficacy of any measures undertaken to improve Dissolved Oxygen concentration in Pond 6 and at the downstream testing site.

As discussed above, the requirements of this condition were not triggered as when the DO concentrations measured at the downstream sampling point were below the minimum limits, similar concentrations were also measured at the upstream sampling point. However, in response to the low DO readings in the week of 27 February 2019, MDC undertook a 72-hr continuous monitoring exercise beginning on the 18th of March. As the results of this monitoring were found to be invalid due to algal coating of the probe, a second 72-hour monitoring exercise was begun on 1 April 2019. The results from this are graphically shown in Figure 2-2. As shown by the graph, DO at the outlet of Pond 6 dropped below 5g/m^3 on 2 April 2019 from 6am to 11am, but rose significantly by 2pm, where it was likely greater amounts of sunlight promoted photosynthesis in pond algae. DO concentrations during mornings increased in the subsequent two days.

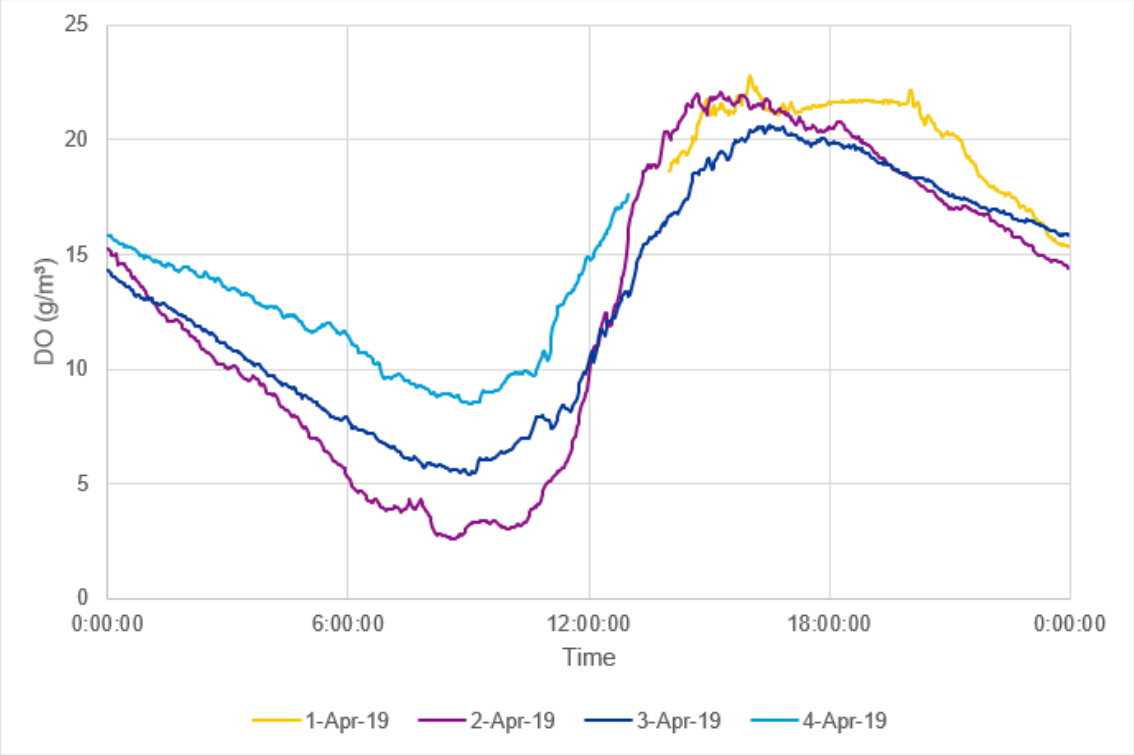

Figure 2-2 72 Hour DO Monitoring at Outlet of Pond 6

2.11 Condition 14 – Ecological Assessment

Within 24 months of the grant of the consent the consent holder shall undertake an ecological assessment of the effect that the discharge is having on Starborough Creek. The assessment shall be undertaken by a suitability qualified and experienced ecologist. The assessment shall include but not be limited to the effect of the discharge on water quality and instream ecology. A copy of the ecological assessment shall be provided to the Council's Compliance Manager.

As this consent was granted in May 2018, the ecological assessment is to be completed by May 2020. The completed report will be submitted with the 2019/2020 annual report.

2.12 Condition 15 & 16 – Reporting to Council

Condition 15:

The results of the monitoring required under conditions 7, 10 - 11 shall be provided to the Council in accordance with Condition 16 or on request.

Condition 16:

The consent holder shall annually from the commencement of this consent and for the period 1 July to 30 June of each year, provide to the Council a written monitoring report that:

a) *Includes all sampling and monitoring results and records;*

b) *Includes any retesting results and annual summary that may have been required in relation to Dissolved Oxygen concentration under condition 13;*

c) *Provides an analysis of sampling and monitoring results and trends and actions taken including any re-testing under condition 5;*

d) *Includes details of any complaints received regarding the operation of the treatment plant and how they have been responded to and, where necessary, the actions undertaken to address the cause of the complaint; and*

e) *Summarises the state of compliance with the conditions of these consents.*

The submission of this annual monitoring report satisfies Conditions 15 and 16.

2.13 Condition 17 – Land Disposal Investigation

By August of each year, the consent holder shall provide an update to the Council and Te Rūnanga o Kaikōura of land disposal investigation undertaken and progress made on implementation.

No update on the land treatment and disposal investigation being undertaken was provided to the Council and Te Rūnanga o Kaikōura in the 1 July 2018 – 30 June 2019 monitoring period. However, it is understood that an update was provided on 22 August 2019 which is outside the prescribed period. But due to the short length of time between the issuing of the decision document for the new consent and the required update (68 days), it is unlikely that there were any significant updates to report on.

2.14 Condition 18 – Resource Consent Applications

The consent holder shall lodge any resource consent applications and (if necessary) notices of requirement to implement the option identified prior to the expiry of these consents.

No new resource consent application has been lodged during this monitoring period.

2.15 Condition 19 – Warning Sign

A warning sign highlighting the presence of the discharge shall be maintained on the bund where Starborough Creek exits the gorge and enters the Awatere River bed warning people of the treated wastewater discharge.

A warning sign is in place at the point where Starborough Creek enters the Awatere river bed, fulfilling the requirements of this condition.

2.16 Condition 20 – Structural Condition

The Consent Holder shall ensure that all structures and works authorised under this consent are maintained in a structurally sound condition at all times to the satisfaction of the Council.

The existing structures are maintained in a structurally sound condition to the satisfaction of the Council. The Operation and Management Plan dated February 2019 requires that the Council's Operations staff and contractors carry out regular maintenance under the control of the STP Operator.

2.17 Condition 21 & 22 – Sewage Treatment Incidents

Condition 21:

The consent holder shall advise the Compliance Manager, Marlborough District Council, the Medical Officer of Health and Te Rūnanga o Kaikōura as soon as practicable and, as a minimum requirement, within 48 hours of any accidental discharge, plant breakdown or other contingency (Incident) which is likely to result in an abnormal discharge quality.

Condition 22:

Within seven working days of an Incident occurring, the consent holder shall submit a written report describing the Incident, the reasons for it occurring, its consequences (including the nature of any complaints), the measures taken to remedy or mitigate its effects, and any measures taken to prevent a recurrence of the Incident, including any changes to operating procedures to the Compliance Manager, Marlborough District Council, and Te Rūnanga o Kaikōura.

No incidents of the nature described in the above conditions were reported at the Seddon STP over the 2018/2019 monitoring period.

2.18 Condition 23 – Discharge to Air

The consent holder shall notify the Compliance Manager, Marlborough District Council, in writing of any maintenance or upgrade works to the plant which may increase discharges of contaminants to air on a short-term basis and explain any processes in place to manage the potential effects.

No maintenance or upgrade works were conducted at the Seddon STP over the 2018/19 monitoring period that may have caused an increase in discharges of contaminants to air on a short-term basis.

2.19 Condition 24, 25 & 26 – Complaints Register

Condition 24:

The consent holder shall maintain and keep a Complaints Register for all complaints made about the treatment and discharge operations received by the consent holder.

The Register shall record:

a) The date, time and duration of the event/incident that has resulted in the complaint;

b) The name and address of the complainant;

c) The location of the complainant when the event/incident was detected;

d) The outcome of all investigations including site and boundary surveys following notification of the issue, including an assessment as to whether the odour was likely to have been of an intensity or nature that was offensive;

e) The possible cause of the incident;

f) The weather conditions and wind direction at the site when the incident allegedly occurred, if significant to the complaint; and

g) Any corrective action undertaken by the consent holder in response to the complaint.

Condition 25:

The Complaints Register shall be made available to the Council at all reasonable times.

Condition 26:

Complaints which may indicate non-compliance with the conditions of this resource consent shall be forwarded to the Compliance Manager, Marlborough District Council, within 5 working days of the complaint being received.

The register for complaints relating to the treatment and discharge operations is maintained by MDC. No complaints regarding the STP operation were received by MDC during the monitoring period.

3 Summary

Based on the monitoring results collected during this 2018/2019 period, the Seddon STP complies with all the conditions of the discharge consent U172060.

Discharge volumes were well below the consent limits, and no significant changes to the downstream receiving water quality were observed from the monitoring data. Dissolved oxygen readings show that the oxidation ponds appear to be in good health.

No complaints or incidents relating to the STP were recorded during this monitoring period.

As MDC has yet to determine a suitable land discharge option for the Seddon STP, treated effluent will continue to be discharged to the Starborough Creek for the time being.

4 Conclusions

The Seddon STP continues to perform well, producing an effluent discharge which meets the conditions of the new consent.

A

Appendix A – Oxidation Pond and Sampling Locations


D/S MDC
Oxidation Pond
Discharge
Tertiary
Outlet Seddon
Pond 2
U/S MDC
Oxidation Pond
Discharge
0
100
200
400
600
800
1,000
1,200
1,400
Meters

B

Appendix B – Consent U170260

Attachment: Conditions

1. The activity shall be in general accordance with resource consent application U170260, received by Council on 21 April 2017 and the revised application received by Council on 31 May 2017.

2. The discharge shall not exceed 570 cubic meters per day (average over any one week) of treated wastewater from the Seddon Sewage Treatment Plant.

3. The consent holder shall measure the volume of wastewater discharged to Starborough Creek on a daily basis. The results shall be provided to the District Council as part of the reporting required under Condition 16 or on request.

4. The discharge of treated wastewater through the outfall shall not cause any of the following effects outside of the 300 metre mixing zone:

    a) A change in the temperature of the receiving water of more than 3 degrees Celsius

    b) Any significant adverse effects on aquatic life as assessed by the survey required by Condition 14 of this consent

    c) There shall be no production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials

5. In the event one of the above effects listed in 4(a) – (c) above is identified, the consent holder shall:

    a) Have a suitably qualified person retest/reinspect no later than 48 hours after first identifying the effects to confirm there is an effect;

    b) If the retesting/reinspection confirms identification of an effect listed in 4(a) to (c), the consent holder shall inform the Council's Compliance Manager within 24 hours of receiving the results and provide the following information:

        i. The steps that are to be taken to identify the cause of the effect; and

        ii. The timeframe for investigating the cause of the effect.

    c) If the investigation into the cause of the effect confirms that the discharge:

        i. Is the cause, the consent holder shall inform the Council's Compliance Manager of the best practicable measures that are going to be undertaken to avoid, remedy or mitigate the effects and the timeframe for implementing the measure(s), to the satisfaction of Council's Compliance Manager; or

        ii. Is not the cause, the consent holder shall inform the Council's Compliance Manager of the outcomes of the investigation within 48 hours of receiving the results of the investigation.

6. The consent holder shall have a suitably trained person take weekly Dissolved Oxygen and pH readings at the outlet of Pond 6. If the weekly Dissolved Oxygen readings identify that there is a declining trend in Dissolved Oxygen (for samples taken between 11am and 2pm), then the consent holder shall take best practicable measures to improve those Dissolved Oxygen concentrations. Best practicable

measures may include, but shall not be limited to, the measures identified in the Council's Operation and Management Plan required under condition 8.

7. The consent holder shall take grab samples of the wastewater from the outlet of Pond 6 every three months and analyse the samples for the following:

    a) Biochemical oxygen demand

    b) Total suspended solids

    c) Conductivity

    d) Total nitrogen

    e) Ammonia-Nitrogen

    f) Total phosphorus

    g) Dissolved reactive phosphorus

    h) E. coli

    i) Faecal coliforms

    j) Dissolved oxygen

    k) Temperature

    l) pH

8. The consent holder shall prepare and submit an Operation and Management Plan (OMP) to the Council's Compliance Manager within two months of commencement of the consent. The objective of the OMP is to ensure that the operation and management of the Seddon Sewage Treatment Plant complies with the conditions of the resource consent. The OMP shall document all relevant site management monitoring and operational procedures and contingency plans.

9. The consent holder shall operate the Seddon Sewage Treatment Plant in accordance with the OMP (including any new version of, or amendment to the OMP). The consent holder shall ensure that any amendments to the OMP, or new versions of the OMP are provided to the Council's Compliance Manager.

10. The consent holder shall carry out a programme of receiving environment monitoring for the duration of the consent as follows:

    a) Water samples shall be taken by a suitably trained person on a three monthly basis at the following locations:

        i. Upstream: where State Highway 1 crosses Starborough Creek

        ii. Downstream: approximately 300m of the discharge point (or as close to that point as practical taking into account the ephemeral nature of Starborough Creek)

    b) Samples shall be analysed for:

i. Total biochemical oxygen demand

ii. Total suspended solids

iii. Conductivity

iv. Nitrate

v. Total nitrogen

vi. Ammonia

vii. Ammoniacal nitrogen

viii. Dissolved inorganic nitrogen

ix. Total phosphorus

x. Dissolved reactive phosphorus

xi. E. coli

xii. Faecal coliforms

xiii. Dissolved oxygen (samples to be taken between 9.30am – 2.30pm)

xiv. Temperature

xv. pH

c) The concentration of Dissolved Oxygen in the downstream receiving water shall not drop below 6 mg/L unless upstream is less than 6 mg/L. If the concentration of dissolved oxygen is below 6mg/L, then the consent holder shall take the actions set out at condition 13.

d) If the downstream concentration of Dissolved Oxygen is below 4mg/L, then the consent holder shall take the actions identified at condition 13, regardless of what the upstream concentration is.

11. Dissolved Oxygen shall be measured continuously by a suitably trained person (using a Dissolved Oxygen logger) at the upstream and downstream locations specified in condition 10(a) for two separate periods of seven days each summer for the term of the consent. The weekly measurements shall be undertaken when flows are low to determine the Dissolved Oxygen 7-day mean minimum and the 1-day minimum.

12. Based on the continuous monitoring data collected under condition 11:

a) if the 7-day mean dissolved oxygen minimum at the downstream site is below 6mg/L, or the 1-day dissolved oxygen minimum is below 5mg/L, the consent holder shall take the actions identified at condition 13 unless upstream is also below those concentrations; or

b) if the downstream Dissolved Oxygen concentration is below 5mg/L for the 7-day mean Dissolved Oxygen minimum, or 4mg/L for the 1-day Dissolved Oxygen minimum, the consent holder shall take the actions identified at condition 13 regardless of the upstream concentration.

13. If Dissolved Oxygen concentrations are below the limits identified in conditions 10(c), 10(d) and 12, then the consent holder shall:

    a) At the outlet of Pond 6 either:

        i. Take spot measurements of Dissolved Oxygen during the day and at dawn; or

        ii. Operate a continuous logger;

        over a period of 72 hours to determine the daily Dissolved Oxygen minimum;

    b) If the daily Dissolved Oxygen minimum identifies that Dissolved Oxygen at the outlet of Pond 6 falls below 5mg/L at any time during the 72 hour period, then the consent holder shall as soon as possible:

        i. take best practicable measures, which may include, but are not limited to, an aerator or recirculation of water from pond 6 to pond 5, to improve the Dissolved Oxygen concentration in Pond 6; and

        ii. at the same time the best practicable measures are being implemented, continuously log Dissolved Oxygen at the downstream site specified at condition 10(a)(ii) and at the outlet of Pond 6 over a minimum of 72 hours to confirm whether there is an improvement in the Dissolved Oxygen concentration.

    c) The results of the retesting shall be provided to the Council as part of the annual written monitoring report under condition 16 along with a summary by a suitably qualified person of the efficacy of any measures undertaken to improve Dissolved Oxygen concentration in Pond 6 and at the downstream testing site.

14. Within 24 months of the grant of the consent the consent holder shall undertake an ecological assessment of the effect that the discharge is having on Starborough Creek. The assessment shall be undertaken by a suitability qualified and experienced ecologist. The assessment shall include but not be limited to the effect of the discharge on water quality and instream ecology. A copy of the ecological assessment shall be provided to the Council's Compliance Manager.

15. The results of the monitoring required under conditions 7, 10 - 11 shall be provided to the Council in accordance with Condition 16 or on request.

16. The consent holder shall annually from the commencement of this consent and for the period 1 July to 30 June of each year, provide to the Council a written monitoring report that:

    a) Includes all sampling and monitoring results and records;

    b) Includes any retesting results and annual summary that may have been required in relation to Dissolved Oxygen concentration under condition 13;

    c) Provides an analysis of sampling and monitoring results and trends and actions taken including any re-testing under condition 5;

d) Includes details of any complaints received regarding the operation of the treatment plant and how they have been responded to and, where necessary, the actions undertaken to address the cause of the complaint; and

e) Summarises the state of compliance with the conditions of these consents.

17. By August of each year, the consent holder shall provide an update to the Council and Te Rūnanga o Kaikōura of land disposal investigation undertaken and progress made on implementation.

18. The consent holder shall lodge any resource consent applications and (if necessary) notices of requirement to implement the option identified prior to the expiry of these consents.

19. A warning sign highlighting the presence of the discharge shall be maintained on the bund where Starborough Creek exits the gorge and enters the Awatere River bed warning people of the treated wastewater discharge.

20. The Consent Holder shall ensure that all structures and works authorised under this consent are maintained in a structurally sound condition at all times to the satisfaction of the Council.

21. The consent holder shall advise the Compliance Manager, Marlborough District Council, the Medical Officer of Health and Te Rūnanga o Kaikōura as soon as practicable and, as a minimum requirement, within 48 hours of any accidental discharge, plant breakdown or other contingency (Incident) which is likely to result in an abnormal discharge quality.

22. Within seven working days of an Incident occurring, the consent holder shall submit a written report describing the Incident, the reasons for it occurring, its consequences (including the nature of any complaints), the measures taken to remedy or mitigate its effects, and any measures taken to prevent a recurrence of the Incident, including any changes to operating procedures to the Compliance Manager, Marlborough District Council, and Te Rūnanga o Kaikōura.

23. The consent holder shall notify the Compliance Manager, Marlborough District Council, in writing of any maintenance or upgrade works to the plant which may increase discharges of contaminants to air on a short term basis and explain any processes in place to manage the potential effects.

24. The consent holder shall maintain and keep a Complaints Register for all complaints made about the treatment and discharge operations received by the consent holder. The Register shall record:

a) The date, time and duration of the event/incident that has resulted in the complaint;

b) The name and address of the complainant;

c) The location of the complainant when the event/incident was detected;

d) The outcome of all investigations including site and boundary surveys following notification of the issue, including an assessment as to whether the odour was likely to have been of an intensity or nature that was offensive;

e) The possible cause of the incident;

f) The weather conditions and wind direction at the site when the incident allegedly occurred, if significant to the complaint; and

g) Any corrective action undertaken by the consent holder in response to the complaint.

25. The Complaints Register shall be made available to the Council at all reasonable times.

26. Complaints which may indicate non-compliance with the conditions of this resource consent shall be forwarded to the Compliance Manager, Marlborough District Council, within 5 working days of the complaint being received.

27. The Marlborough District Council may, during June or July of each year, or within 2 months of receiving the annual report required under Condition 16 serve notice of its intention to review and amend or add to the conditions of this resource consent under section 128 of the Resource Management Act 1991 for the purpose of:

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

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

c) Requiring the Consent Holder to carry out monitoring in addition to or instead of that required by the resource consent; or

d) Addressing any issues identified in the annual reports submitted under Condition 16 of this resource consent.

C

Appendix C – Flow Monitoring Data

Jan-19	Seddon Flow (m3/day)	Feb-19	Seddon Flow (m3/day)	Mar-19	Seddon Flow (m3/day)	Apr-19	Seddon Flow (m3/day)	May-19	Seddon Flow (m3/day)	Jun-19	Seddon Flow (m3/day)
1	144.00	1	48.11	1	76.37	1	45.57	1	27.08	1	24.21
2	119.38	2	102.78	2	73.81	2	46.08	2	27.62	2	24.89
3	109.19	3	98.20	3	76.86	3	45.02	3	27.32	3	23.74
4	118.55	4	102.25	4	76.45	4	44.65	4	26.39	4	23.01
5	92.36	5	99.50	5	72.95	5	45.01	5	27.43	5	22.32
6	117.20	6	74.63	6	65.69	6	45.34	6	26.16	6	21.88
7	90.04	7	75.85	7	62.38	7	45.00	7	27.02	7	21.66
8	85.13	8	85.50	8	53.91	8	0.75	8	26.03	8	20.65
9	101.29	9	107.09	9	53.15	9	44.40	9	25.53	9	20.00
10	107.61	10	116.00	10	54.77	10	43.77	10	23.79	10	21.22
11	99.10	11	112.28	11	54.77	11	41.92	11	22.19	11	20.20
12	110.58	12	113.70	12	54.62	12	41.36	12	21.19	12	20.06
13	109.46	13	100.58	13	54.38	13	41.12	13	22.41	13	22.37
14	115.03	14	102.77	14	55.09	14	39.63	14	26.04	14	22.56
15	127.47	15	102.89	15	57.90	15	39.64	15	26.88	15	20.61
16	99.00	16	95.05	16	60.02	16	41.63	16	25.23	16	20.22
17	40.34	17	104.29	17	54.90	17	41.48	17	24.65	17	21.51
18	30.34	18	98.93	18	55.91	18	38.35	18	23.04	18	19.47
19	153.81	19	118.02	19	53.84	19	41.53	19	21.12	19	20.04
20	120.46	20	122.61	20	54.41	20	41.56	20	24.23	20	21.21
21	79.69	21	127.69	21	55.07	21	40.84	21	25.14	21	21.04
22	55.55	22	130.92	22	29.24	22	41.32	22	25.08	22	21.77
23	54.30	23	119.70	23	83.14	23	39.07	23	25.15	23	22.73
24	65.24	24	110.89	24	51.91	24	36.08	24	24.84	24	22.58
25	43.55	25	122.78	25	51.19	25	35.85	25	26.29	25	21.37
26	131.88	26	96.64	26	51.15	26	30.93	26	24.41	26	23.12
27	138.84	27	86.37	27	51.33	27	28.00	27	24.18	27	20.80
28	121.37	28	82.65	28	48.80	28	28.11	28	22.72	28	17.79
29	110.72			29	47.70	29	29.54	29	22.95	29	13.99
30	104.37			30	47.39	30	30.14	30	23.86	30	13.89
31	29.06			31	46.23			31	23.92		

Jul-18	Seddon Flow (m3/day)	Aug-18	Seddon Flow (m3/day)	Sep-18	Seddon Flow (m3/day)	Oct-18	Seddon Flow (m3/day)	Nov-18	Seddon Flow (m3/day)	Dec-18	Seddon Flow (m3/day)
1	144.30	1	134.15	1	377.57	1	67.79	1	161.30	1	174.27
2	151.30	2	131.21	2	292.37	2	68.56	2	136.69	2	143.30
3	161.78	3	139.68	3	200.39	3	69.72	3	114.06	3	76.88
4	142.59	4	177.12	4	216.46	4	92.61	4	112.10	4	39.95
5	130.63	5	180.79	5	220.12	5	87.98	5	102.67	5	125.63
6	132.42	6	211.36	6	263.79	6	76.73	6	90.61	6	243.63
7	138.42	7	321.11	7	310.87	7	183.56	7	70.48	7	174.61
8	134.02	8	228.15	8	327.37	8	146.93	8	118.19	8	116.76
9	233.67	9	192.65	9	281.48	9	113.95	9	118.15	9	145.05
10	399.02	10	212.20	10	215.52	10	88.25	10	171.45	10	130.99
11	253.30	11	162.21	11	216.63	11	65.14	11	250.55	11	64.62
12	172.91	12	132.82	12	176.36	12	84.27	12	167.53	12	284.19
13	141.72	13	134.57	13	133.45	13	102.06	13	131.46	13	231.70
14	142.14	14	128.92	14	127.70	14	81.79	14	118.98	14	139.23
15	165.79	15	123.70	15	139.85	15	58.55	15	104.89	15	182.76
16	166.26	16	128.55	16	158.60	16	72.90	16	81.39	16	155.05
17	204.17	17	144.82	17	136.30	17	146.69	17	78.56	17	121.33
18	188.17	18	144.89	18	117.57	18	226.31	18	100.60	18	129.39
19	209.40	19	143.33	19	108.95	19	143.31	19	101.79	19	84.42
20	200.13	20	134.28	20	80.19	20	143.14	20	100.23	20	161.97
21	197.13	21	175.43	21	96.66	21	167.14	21	117.70	21	359.54
22	195.42	22	230.88	22	99.81	22	131.33	22	114.47	22	205.34
23	204.30	23	173.22	23	93.32	23	115.88	23	113.37	23	195.94
24	164.40	24	135.60	24	69.78	24	123.83	24	125.97	24	129.81
25	173.72	25	130.11	25	56.37	25	106.55	25	127.07	25	98.51
26	180.41	26	123.08	26	401.72	26	157.31	26	168.81	26	309.92
27	174.14	27	119.39	27	273.96	27	250.07	27	324.95	27	360.08
28	171.30	28	117.37	28	152.14	28	220.12	28	425.98	28	184.19
29	163.72	29	114.11	29	109.24	29	209.83	29	420.84	29	95.97
30	144.94	30	182.03	30	86.59	30	198.90	30	292.87	30	40.10
31	137.75	31	314.08			31	227.05			31	99.21

D

Appendix D – Seddon Operation and Management Plan

Seddon Sewage Treatment Plant

Operation and Management Plan

Assets and Services Department

February 2019

1. Introduction

1.1 Purpose

The purpose of this Operation and Management Plan (OMP) is to actively manage the treatment plant in an efficient and effective manner to meet the following primary goals:

- Ensure that the operation and management of the Seddon STP complies with the conditions of the resource consent U170260 (Appendix C).
- Protect public health;
- Protect the environment;
- Avoid nuisance;
- Meet resource consent conditions;
- Minimise risk of upset to the ponds.

1.2 Method Statement

This OMP will achieve the above purpose by regular monitoring of pond processes and treatment performance; coupled with a plan of action for foreseeable difficulties should they arise.

Over the five years from 2018-2023 it is proposed to retain the pond treatment system and apply the effluent to land. The aim is to end discharge to Starborough Creek in all but emergency conditions.

1.3 Proposed Upgrading

It is proposed to carry out the following upgrades in 2018/19.

- Install a fine screen on the plant influent
- Install flow metering on the plant influent
- Survey the sludge in Pond 1 and de-sludge Pond 1 as required
- Install Pond 6 to Pond 2 recirculation

1.4 Scope

This OMP has been prepared on the basis of the conditions of resource consent U170260. The resource consent conditions for U170260 are referred to in Appendix C to this OMP.

The scope of this OMP is limited primarily to the Seddon Sewage Treatment Plant (SSTP) and does not cover the sewer reticulation.

2. Background to the Seddon Sewage Treatment Plant (SSTP)

2.1 Original Treatment Plant

The SSTP is located northeast of Seddon and is accessed from State Highway 1. SSTP was constructed in 1977. Sewers were constructed throughout the town to convey sewage to the pond treatment system. A vertical outfall was constructed to allow treated effluent from Pond 2 to discharge to Starborough Creek.

The ponds were designed with appropriate surface area for the loading.

2.2 Major Upgrade to SSTP in 1997

In 1997 a major upgrade was completed which saw existing Pond 2 subdivided into a series of 5 maturation ponds, thereafter known as Ponds 2-6. This pond subdivision provided improved indicator bacteria die off and also increased nitrification which reduces ammonia in the effluent during warmer conditions.

At the same time a temporary pond was constructed adjacent to Pond 1. The temporary pond was used as the first treatment pond while Pond 1 was de-sludged and a clay liner constructed. Damage to the pond's concrete waveband was also repaired.

2.3 Resource Consents Applications

Resource consent has been granted (U170260) for a 5 year term (exp. 18th June 2023) to continue operating the SSTP in its current state while Council plans and applies for resource consents to construct a land treatment system.

3. Operations, Flows and Loads

3.1 Issues with Pond Treatment

High sunshine hours and wind provide ideal conditions for pond treatment at Seddon.

Mechanical sewage treatment plants typically require significant energy input to provide the oxygen necessary for treating the organic waste load. In facultative ponds, such as Pond 1 at SSTP, almost all that oxygen comes from the photosynthesis of algae during day light hours.

Treatment capacity is reduced in winter due to colder temperatures and reduced sunshine hours because of the effects these conditions have on algae. A cage rotor (brush type) aerator can be beneficial in these conditions, not entirely because of the direct oxygen transfer but also the mixing which assists algae, especially non-motile species to achieve better distribution throughout the water column.

Although ponds are generally relatively stable in operation, overloading, under loading, low temperatures, light winds, cloud cover and short sunshine hours in winter, can all "stress" a pond system and result in treatment process failure.

Another significant issue which has caused upset to ponds in New Zealand is internal fungal parasites. These typically affect some specific algal groups and not others, so complete pond failure is not common. However, there has been at least one instance in this country where the algal group that was badly parasitized was the main algal group (Euglena) which is found at the SSTP. An outbreak of a similar type at the SSTP would have an adverse effect.

3.2 Operations

Sewage enters pond 1 (facultative pond) by gravity from the town's sewers. There are only two pumps within the reticulation and they are each only lifting the sewage from a few houses.

The sewage is primarily domestic in nature. There is a camping ground and retail premises typical of a town the size of Seddon that are connected to the sewer. A transport company has a stock washdown tank connected to the sewer. The Seddon Water Treatment Plant discharges backwash to the sewer at 40-70m³/d. There are currently no sources of high strength sewage and the ponds have been operating within their capacity.

3.3 Trigger Points

Triggers for taking further actions require development with the benefit of experience and understanding the processes. Pond systems involve complex and dynamic processes. Algae are an essential component, providing greater than 95% of the dissolved oxygen required for the bacteria that breakdown the sewage.

Any sudden change in a monitored parameter indicates the potential for an adverse reaction on the treatment process. For a scheme this size it is appropriate to measure the dissolved oxygen (DO), the temperature and the pH of Pond 1 and the outlet at the final pond (Pond 6) on a weekly basis. Odour is also checked and noted along with pond condition from visual observation. Weather conditions are also recorded.

Monthly samples of Pond 1 and Pond 6 are sent to Laboratories for analysis and reporting of chlorophyll-a and relative abundance of algae.

Samples from the outlet of Pond 6 are taken every three months to analyse the following:

a) BOD

b) TSS

c) Conductivity

d) Total nitrogen

e) Ammonia-Nitrogen

f) Total phosphorus

g) Dissolved reactive phosphorus

h) E.coli

i) Faecal coliforms

j) Dissolved oxygen

k) Temperature

l) pH

The receiving environment in the Starborough Creek is also monitored. Samples are taken on a three monthly basis at designated sampling points Upstream (US) and Downstream (DS) of the discharge point. Samples are analysed for:

i. Total BOD

ii. TSS

iii. Conductivity

iv. Nitrate

v. Total nitrogen

vi. Ammonia

vii. Ammonical nitrogen

viii. Dissolved inorganic nitrogen

ix. Total phosphorus

x. Dissolved reactive phosphorus

xi. E.coli

xii. Faecal coliforms

xiii. Dissolved oxygen (samples to be taken between 9.30am – 2.30pm)

xiv. Temperature

xv. pH

Trigger points and actions are shown as follows:

Table 3.1

Trigger Points and Responses

Measure	Trigger	Action
DO Pond 1	Declining trend in DO or DO <2 g/m^3 (11:00-14:00) for two consecutive readings	'A'
DO Pond 6	Declining trend in DO or DO <6 g/m^3 (11:00-14:00) for two consecutive readings	'B'
Pond Colour	Interpretation of pond colour[1]	'C'
Chlorophyll-a dropping in Ponds 1 and 6	Chlorophyll-a < 200 mg/m^3 (11:00-14:00)	'D'
pH ponds	pH < 6.5 average or pH > 9	'E'
DO Ponds 1 and 6	DO elevated at > 5g/m^3 during day and remaining high > 4 g/m^3 after dark, high TSS > 100 g/m^3, or Chlorophyll-a > 600 mg/m^3, low grazer abundance.	'F'
DO in the DS sampling point	Shall not drop <6mg/L unless US is < 6mg/L.	'G'
DO in the DS sampling point	DO < 4mg/L	'G'
7 day mean DO minimum at DS sampling point	DO <6mg/L, or the 1-day DO minimum <5mg/l, unless US is also below conditions.	'G'
	DO <5mg/L or 4mg/L for 1 day DO minimum.	'G'
Discharge of treated wastewater outside of the 300m mixing zone	Change in temperature of receiving water >3°C	'H'
Discharge of treated wastewater outside of the 300m mixing zone	Conspicuous oil or grease films, scums or foams, or floatable or suspended materials.	'H"

Actions

'A' Condition: Falling or low DO in Pond 1 suggestive of high loading

(a) Operate aerator on Pond 1;

(b) If one of the maturation ponds has DO >4 g/m³, consider pumping pond liquor from that pond(s) to Pond 1;

(c) Consider additional monitoring, in particular additional measurements of DO in Pond 1 and in the maturations ponds;

(d) Check BOD of influent if issue persists. If BOD is higher than expected, investigate source.

[1] Table 4-3 Connection between colour of the pond and operational characteristics. Water NZ Good Practice Guide: Waste Stabilisation Ponds: Design and Operation; November 2017

‘B’ Condition: Falling or low DO in Pond 6

(a) Operate aerator/mixer on maturation ponds, or;

(b) Operate recirculation from Pond 6 to Pond 2

‘C’ Condition: Pond colour shows an issue that could adversely affect performance

(a) Investigate potential causes;

(b) Reduce loading on affected pond by diverting flow;

(c) Consider pumping from healthy pond to affected pond

‘D’ Condition: Parasite attacking algae

(a) Reduce loading on affected pond by diverting flow;

(b) Consider pumping from healthy pond to affected pond.

‘E’ Condition: pH out of optimum operating range. High pH could be associated with stratification.

(a) Low pH. Consider adding lime;

(b) Measure pH at different depths. Consider running an aerator or mixer to generate mixing.

‘F’ Condition: High DO, high TSS, high Chlorophyll-a; likely to be due to high concentrations of algae which may occur with long retention times and low loading. It could lead to excessive algal grazing and a drop off in algae.

(a) Turn off aerator if running;

(b) Check for grazers eg; Rotifers. Consider further monitoring of DO, TSS and Chlorophyll-a;

(c) Consider ‘seeding’ grazers;

(d) Operate (proposed) pond 6 to Pond 2 recycle operation (Note recirculation will typically run continuously at 1 x ADWF except in high wet weather flows when recirculation will be stopped).

‘G’ Condition: if Dissolved Oxygen concentrations are below the limits then the following measures are to be carried out:

a) At the outlet of Pond 6 either:

i. Take spot measurements of DO during the day and at dawn; or

ii. Operate a continuous logger;

Over a period of 72 hours to determine the daily DO minimum;

b) If the daily DO minimum identified that DO at the outlet of Pond 6 falls below 5mg/L at any time during the 72 hr period, then the following shall be carried out as soon as possible:

i. Take best practicable measures, which may include, but are not limited to, an aerator or reciculation of water from pond 6 to pond 5, to improve the DO concentration in Pond 6; and

At the same time the best practicable measures are being implemented continuously log DO at the DS site and at the outlet of Pond 6 over a minimum of 72 hours to confirm whether there is an improvement in the DO concentration.

'H' Condition: If one of the effects occurs, the following measurers are to be carried out:

a) Retest/re-inspect within 48 hours after first identifying the effects to confirm there is an effect;
b) If the retesting/re-inspection confirms identification of an effect, notify the Councils Compliance Manager within 24 hours of receiving the results and provide the following information:
    i. The steps that are to be taken to identify the cause of the effect; and
    ii. The timeframe for investigating the cause of the effect.
c) If the investigation into the cause of the effect confirms that the discharge;
    i. Is the cause, measures are then required to be undertaken to avoid, remedy or mitigate the effects and the timeframe for implementing the measure(s), to the satisfaction of the compliance manager.
    ii. Is not the cause, notify Councils Compliance Manager of the outcomes of the investigation within 48hours of receiving the results of the investigation.

3.4 Plant Flows and Loads

The design load is 65 kg BOD_5 /day based on 100kg/ha/d aerial loading which is a reasonable design for this location. 65 kg BOD_5 /day is the equivalent of 812 persons at 80 g/c/d. Currently the plant influent is not measured, but there is provision for a flowmeter to be installed on the incoming sewage in 2019/2020. The design (future) influent is 238m^3/d.

Population according to census figures is 500, however Council has received advice that the population can increase to 800 with seasonal vineyard workers.

Influent BOD monitoring requirements will be reviewed once the influent flow meter is installed with the screening equipment.

4. Staffing and Specific Duties

4.1 Key Personnel

The key personnel for implementing this OMP and their responsibilities are as follows.

- Council Management

  Overall responsibility, ie; ensuring people are available, trained, funded etc.

- Council Treatment Operations Supervisor

  Responsible for managing the operation of the SSTP and the monitoring of complaints and compliance.

- Council SSTP Operator

  Operating plant as per this OMP and responding to complaints and keeping management informed of issues.

- Council Environmental Officer/Asset Technician

  Taking samples for laboratory analysis and monitoring Starborough Creek.

- Council operators

  Assisting the SSTP Operator to run the plant, especially in regard to outside normal working hours.

4.2 Operators

Council has several water/wastewater "treatment plant operators". Two wastewater treatment plant operators share the role of "SSTP Operator" and have primary responsibility for managing the SSTP.

The SSTP Operator has assistance from Council's Operations staff for regular maintenance including regularly removing non-biodegradable materials from the waveband of the ponds and in future the screenings collected by the proposed screening equipment.

Council's Assets and Services Department employs an Environmental Officer/Asset Technician who carries out the monitoring of Starborough Creek and the taking of samples for laboratory testing.

Operators are managed by the Treatment Operations Supervisor.

4.3 Regular Maintenance

Regular maintenance will be carried out under the control of the SSTP Operator by Council's Operations staff and contractors.

The SSTP Operator will in the future call on tradesmen to maintain aerators, pumps and screens as these are put into service.

4.4 Monitoring and Laboratory Services

Monitoring of the SSTP including the weekly monitoring is carried out by the SSTP Operator. Taking of samples for laboratory analysis is carried out by the Environmental Officer/Asset Technician. Monitoring of the SSTP includes the following:

- Observations and measurements using hand-held instruments.
- Sampling and analysis by Hill Laboratories.
- Sampling and analysis of algae at Cawthron Institute (subcontracted by Hill).

The monitoring schedules are attached at Appendix B.

4.5 Planning and Development Engineer

The Planning and Development Engineer provides support to the SSTP Operator, particularly when abnormal conditions occur for which no specific course of action is described in the OMP. Notification is required to be provided to the Planning and Development Engineer immediately when abnormal conditions occur to ensure consent conditions are compiled and the Council compliance manager is notified when required.

5. Odour

5.1 Source of Odour

Ponds can be a significant source of odour if they become anaerobic due to either over-loading or upset of the biological processes. Upsets in the biological processes in the ponds can be due to die-off in the algal populations, parasitic fungal attack, predation by higher life forms, or a slowdown in the algal activity due to lack of sunlight and oxygen in the pond. Facultative ponds eg; Pond 1 are more likely to create odour than maturations ponds eg; Ponds 2-6.

Specific consideration will be given to odour during the design of the proposed inlet fine screen and pump station as these facilities have the potential to cause odour.

5.2 Odour Management

Measures to manage odour at SSTP includes the following.

5.2.1 General

- Operate SSTP in accordance with this OMP.

- Check the SSTP for odours each week during the weekly monitoring.
- Follow good housekeeping practices by keeping the plant and the surrounding areas clean and free from rubbish.
- Following an odour complaint, check the plant for odours using Plant Inspection Check Sheet as a guide. A copy of the Plant Inspection Check Sheet is attached in Appendix D1. If odour from the ponds is found to be an issue, undertake a field inspection for odours downwind of the plant using the Field Odour Survey Sheet as a guide. A copy of this is attached in Appendix D2.
- Keep all mechanical equipment well maintained.

5.2.2 Inlet Pump Station and Screen

A new screen is to be installed on the inlet sewage pipeline to the SSTP in 2019/2020.

- Check covers are in place.
- Regularly clean the screen.
- Remove screenings trailer or bin for emptying at the landfill as soon as practicable after filling.
- Ensure trailer or bin is kept covered at all times including during transport to the landfill.

5.2.3 Ponds

Refer to Section 3.3 Trigger Points.

- Consider additional monitoring (to the regular weekly monitoring) of the dissolved oxygen in the ponds in the event of any of the following:
    - unusual odours noticed coming from the ponds
    - unusual colour in the ponds
    - an excessively oily surface in the ponds
    - after receiving an odour complaint
- If an aerator has been running in Pond 1, turn it off if dissolved oxygen is above 4 g/m3.
- Monitor ponds for excessive algae growth, algae die-off and scum on top of ponds.
- Maintain the pond wavebands.
- Survey pond sludge levels at 20 year intervals.

5.2.4 Outfall Structure

- Maintain the outfall structure and check condition after major flood or earthquake.

6. Actions to be Taken in the Event of an Odour Complaint

6.1 Receiving Complaints

Odour complaints at SSTP are relatively rare, however ponds can produce odour under certain conditions, so a process is needed to deal with odours and odour complaints that may arise.

Complaints may be referred from the Marlborough District Council (MDC) or directly to the SSTP Operator from a complainant.

6.2 Actions

The following table sets out the process for dealing with odour complaints.

Table 6.1

Complaints Procedure Summary

Activity	*Responsibility*	*Key Actions*	*Records*
Complaint received and recorded	SSTP Operator	Complaint logged on form at Appendix D3	File Complaint Form on W440-002-004-01
Actions in the event of a complaint – check plant.	SSTP Operator	Investigate the cause of the complaint as soon as practicable and complete the form at Appendix D1	File Plant Inspection Check Sheet on W440-002-004-01
Actions in the event of a complaint – field odour survey.	SSTP Operator or Regulatory Department officer	Visit location of complainant and vicinity as soon as practicable to undertake a field odour survey and assess impact of odour. Complete sheet at Appendix D2.	File Odour Survey Sheet on W440-002-004-01
Reporting	SSTP Operator	Advise MDC Regulatory Dept that a complaint has been received. As soon as practicable (preferably within 3 days) report back on findings and actions to complainant and MDC Regulatory Dept.	Note on complaint form
Action in the event of repeated complaints	Treatment Operations Supervisor	Where several complaints are received in a day or over a week and either the source or solution cannot be identified, further investigation may be warranted. SSTP Operator to advise Treatment Operations Supervisor of complaints. Keep complainants informed of progress	Investigation report to be prepared and filed on W440-002-004-01

6.3 Field Odour Survey

Field odour inspections are a recognised method of determining the effects of odours in the environment. They should be done after a complaint regarding odours is received to assess whether the odour was likely to have been of an intensity or nature that was offensive.

It is important that consistent procedures for odour complaint investigation and reporting are used to ensure that the data collected are useful. The procedures described below are based on those recommended by the Ministry for the Environment.[2]

A field odour survey should be carried out after an odour complaint is received.

The person undertaking the survey should approach the location of the odour complaint from as far downwind of the plant as practicable. This enables the person undertaking the survey to detect the faintest odours from the plant and to note that location. It also prevents overloading the "nose" with strong odours initially and the nose then becoming desensitised.

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[2] Ministry for the Environment "Good Practice Guide for Assessing & Managing Odour in New Zealand" June 2003.

Where there is an obvious shift in wind direction since the lodging of the complaint, it may be more appropriate to go to the current most likely position of the plume rather than to the location of the complaint.

It is often difficult to validate a complaint in every circumstance, as odour emissions are often highly variable with time. For example, an odour's intensity may lessen or disappear during the time between receiving a complaint and doing the survey. This may be due to varying wind conditions and changes in other atmospheric conditions. For these reasons, it is important to stay at the location of the odour complaint for a reasonable length of time.

Details about the intensity, character and impact rating of the odour as recommended in the tables included on the Field Odour Survey Sheet should be recorded. These tables have been reproduced from the German Standard VDI 3882 (I) (1992): *Olfactometry Determination of Odour Intensity*.

The procedure for logging the observations follows the German Standard VDI 3940 *Determination of Odorants in Ambient Air by Field Inspection*. This procedure requires recording the odour intensity every 10 seconds over a 30 minute period in one location. Shorter periods may result in the full extent of the effects being missed. It is acknowledged that it may not be feasible for personnel to spend 30 minutes doing an odour survey. A period of at least 10 minutes is considered a minimum. If repeated complaints come from the same location and they are difficult to verify then a 30 minute period will be necessary.

An exception to the "every 10 seconds for 30 minutes" rule is needed when the odour plume is strong and constant. Staying permanently in the plume will result in the observer becoming desensitised to the odour, so it is appropriate in that case to drive or walk through the plume once every 5-10 minutes, then repeat over a period of at least 30 minutes.

The impact rating of the odour should be assessed at the end of the observation period. This is a summary of the effect of the odour and covers a range of impacts from chronic through to acute effects.

A summary of the recommended procedure for undertaking a field odour survey is tabled below.

Table 6.2

Field Odour Survey and Recording Procedure

Step	***Action***
Receive the complaint or request to undertake a field odour survey	Record the date, time and location of the complaint and the complainant's description of the alleged odour event, including strength, duration and character of the odour. Use the Complaint Form and the Field Odour Survey sheet.
Visit the location of the complaint or a location downwind of the plant for at least 10 minutes (preferably 30 minutes)	Record the time of arrival. Assess and record the strength/intensity, and character of the odour using the intensity descriptors and character descriptors on the form. Record the wind direction and strength, and weather conditions throughout the investigation and how these were determined. Assess the impact the odour has using the ratings on the sheet and considering the location and observations recorded. Assess the width of the odour plume by moving at right angles to the wind direction, where possible Record the time of departure from the location of the complaint.

7. Aerosols

Aerosol generation at wastewater treatment plants is only usually of concern where there is spray irrigation of treated effluent on to land. Aerosols are therefore unlikely to be an issue at SSTP.

8. Noise

8.1 Noise Sources

The only sources of noise at the SSTP is the generator and aerator on the occasions that an aerator is operated. The generator will not be required when the electrical supply is upgraded for the proposed screen and pumps on the inlet to the SSTP. Given the buffer distances to the nearest neighbours, these sources of noise are not considered to be an issue.

8.2 Actions to be Taken in the Event of a Noise Complaint

The same basic procedure should be followed as described for odour complaints. The details of the complainant and the location and time of the noise being noticed should be recorded on a complaint form in Appendix D3. Weather conditions, especially wind direction and strength, should be recorded.

As soon as practicable after receipt of a noise complaint, all mechanical plant is to be checked for excessive noise. If there is significant noise, the plant may require maintenance.

A field investigation should also be made as soon as practicable after the complaint is received. Refer to the form in Appendix D4.

If repeated noise complaints are received, a noise measurement survey should be arranged to be undertaken by an Environmental Health Officer of the MDC, or another suitably qualified person. If the results of this test identify a problem further work may be required to positively identify the source of the noise and the options for mitigating the problem.

9. Monitoring

9.1 Types of Monitoring

Monitoring is a combination of:

- Observation.
- Measurement on site from hand-held instrument.
- Analysis of samples at Hill Laboratories.
- Analysis of pond samples at the Cawthron Institute (or other similar laboratory) for algae species.

Some analyses are better done on site because the time taken to get the sample to the laboratory will render the test inaccurate. This applies in particular to dissolved oxygen (DO). pH will also change over a short time and on site measurement is favoured. Temperature is another measurement that needs to be taken “in-pond”.

On site measurement with hand-held instruments is generally reliable when done regularly by the same operator for consistency. The operator will ensure that the instruments are calibrated and operating correctly.

Air temperature and wind speed are measured by field instruments and the outputs connected to SCADA (supervisory control and data acquisition). The data are stored for future reference and to produce trends.

Operators at SSTP use hand-held instruments for DO, pH and temperature.

Characteristics of the sewage entering the SSTP is measured once a year. Final effluent quality and Starborough Creek water quality is monitored at the frequencies required by the resource consent, Appendix C

9.2 Monitoring Results and Operational Log

Observations and laboratory results are electronically stored and available on Hilltop Manager. An operational log is to be maintained by the SSTP Operator from the date at which the proposed inlet screen and pumps are commissioned. The log is to record all changes in operation of the plant and status. Monitoring results will continue to be available in Hilltop.

10. Health and Safety

The Marlborough District Council is bound by the Health and Safety at Work Act, 2015 to provide a safe work environment. In addition to the guidelines in this Plan, the MDC Health and Safety requirements for operations staff shall be adhered to.

10.1 Safety Equipment

Everyone working at the SSTP shall, at the least, have with them:

- Cellphone
- First aid kit
- Drinking water
- Clean water for handwashing and first aid
- Disinfectant hand wash
- Personal protection equipment (PPE) if working within 1.5 metres of the pond edge
- PPE suitable to the tasks to be performed (Contractor to determine).

10.2 Hazards and Actions

The following table is to be developed by contractors for use during works at SSTP.

Table 10.1

Hazards and Controls

Hazard	Recommended Action
Wastewater contains bacteria and pathogens and on ingestion or skin contact can cause infection.	<u>To minimise risk of contact:</u> Keep back from the pond edge Keep clear of spray from aerators Wear personal protection equipment – consider using disposable gloves. Disposable gloves must be worn by

Hazard	Recommended Action
	persons within 1.5 metres of the pond edge. As a minimum use disinfectant hand cleaner when finishing work and before eating. Dress all cuts to the skin. Avoid putting fingers in ears, eyes, mouth, nose etc Do not smoke.
Contact with wastewater (In ponds and gravity pipe).	<u>In case of contact:</u> On contact with unbroken skin, wash off immediately with clean water and disinfectant. On contact with broken skin, wash off immediately with clean water and disinfectant and seek medical advice immediately. On ingestion, seek medical advice immediately.
Fall, drowning. Concrete waveband is slippery and rock waveband is not stable to step on. River bank near the ponds is vertical and between the ponds it is steep.	Keep back from pond edge Keep off river bank Work in pairs Keep back from edge. Consider loadings near the edge
Overhead power lines	Adhere to safe working clearances
Underground power and control cables	Locate underground cables and have Marlborough Lines mark on site. Hand dig near cables, no machine excavation.
Traffic on SH1 at entrance	Follow the Traffic Management Plan if applicable.

10.3 Working Further Than 1.5metres of Pond Edge

- Keep at least 1.5 metres from the pond edge at all times.
- Extra vigilance to be taken when working around pond edges.
- Always isolate aerators before working in proximity of aerators to avoid spray.
- Set up high visibility net fencing between pond and work site.
- Minimum of two persons to be on site.

10.4 Working Within 1.5 metres of Pond Edge

- All persons within a 1.5 metre perimeter of the pond edge are to wear PPE and lifejackets. Minimum PPE required is disposable gloves.

- Extra vigilance to be taken when working around pond edges, only use suitable access points.

- When working on cage aerators, lifejackets are to be worn.

- Always isolate aerators before commencing any kind of work or inspection.

- When working in the boat, at least two people to be present with lifejackets. Third person on shore (with cell phone) to raise alarm in an emergency.

- Life buoy on rope to be present for emergency use.

- Beware that concrete waveband is slippery and rocks in rock wavebands can be expected to move if stood on.

10.5 Vehicles Around Pond Edges

- Speed limit 20 km/h

- When driving alongside pond edges care to be taken with regard to incline of pond bank.

- No vehicles permitted on south side of Pond 1 adjacent to Starborough Creek.

Operators having regular contact with raw wastewater or treated effluent should be immunised against Hepatitis A and B, Tetanus and Polio.

Hazards may be present due to poisonous gases, explosive gases or lack of oxygen which are particular risks at sewage pump stations. Appropriate procedures must be followed and appropriate equipment worn when working in areas with hazardous gases.

Operations staff are to carry out the necessary planning and produce H&S Plans for each specific work task to be undertaken at the SSTP. This is to include identifying hazards, the treatment of each hazard and the personnel protection equipment requirements. Everyone entering the SSTP is to be made aware of all hazards on the site and the H&S Plans applicable to their work or visit.

11. Tradewaste

Council is reviewing tradewaste discharges in Seddon. The Treatment Operations Supervisor manages tradewaste and the issuing of tradewaste consents.

Appendix A – Pond Observations

Tables from “Water NZ Good Practice Guide: Waste Stabilisation Ponds: Design and Operation; November 2017”.

Appendix A1 – Pond Colour

Pond Colour	Interpretation
Dark green and partially transparent	Unimportant presence of other microorganisms in the effluent High pH and DO values Pond in good condition
Orange red	Bloom of *Daphnia* or *Moina* which will reduce pond algae and DO concentrations
Yellow green or excessively clear	The result of a rotifers, protozoa or cladoceran bloom which graze on the algae and can decimate their population in days If the conditions persist, there will be a decrease in DO and the potential for odour nuisance.
Greyish	Overload of organic matter and/or short detention time Incomplete anaerobic digestion in the sludge layer The pond should be put out of operation
Milky green	The pond is in a self-flocculation process as a result of high pH and temperature causing flocculation of algae with magnesium and calcium hydroxides.
Blue greenish	Excessive proliferation of cyanobacteria The bloom of a certain species forms a scum that decomposes easily, leading to bad smells, reduction of light penetration and green algae, as a consequence, reduction in oxygen production
Brownish red	Overload of organic matter Presence of photosynthetic sulphide-oxidising bacteria (they require light and sulphides, use CO_2 as an electron acceptor, do not produce oxygen and do not help in BOD removal).

Source: Arceivala (1981) and CETESB (1989)

Appendix A2 – Principal Causes of Effluent Quality Deterioration

Contaminant	Typical Effluent Concentration	Deviation	Potential Causes	Potential Solutions
TSS	10 – 150 mg/L	> 50 mg/L	Algal growth Sludge build-up	Outlet shading Desludge
BOD	15 – 110 mg/L	> 40 mg/L	Algal growth Sludge build-up	Outlet shading Desludge
NH_4-N (winter)	0.5 – 30 mg/L	> 15 mg/L	Cold temperatures Sludge build-up Low DO Overloading	- Desludge Add aeration Reduce load
NH_4-N (Summer)	0.1 – 10 mg/L	> 5 mg/L	Sludge build-up Low DO Overloading	Desludge Add aeration Reduce load
DRP	2 – 12 mg/L	> 6 mg/L	High influent concentrations Sludge build-up	- Desludge
TP	4 – 16 mg/L	> 8 mg/L	High influent concentrations Sludge build-up	- Desludge
E. coli	2,000 – 50,000 cfu/100mL	> 10,000 cfu/100mL	Short-circuiting	Improve hydraulics
Faecal coliforms	5,000 – 100,000 cfu/100mL	> 20,000 cfu/100mL	Short-circuiting	Improve hydraulics

Appendix B – Weekly Monitoring Schedule

Weekly Monitoring Schedule – U0600927

Seddon Sewage Treatment Plant - Weekly Operational Monitoring										MARLBOROUGH DISTRICT COUNCIL		
Hilltop Reference Name : *Sewage Operational, Weekly, Seddon* ***(Week of _____-Week _____)***										*Sample Person:*		
Site Code	***Hilltop Sample #***	***Date & Time***	***Dissolved Oxygen***	***pH***	***Temp***	***Colour***	***Colour Intensity***	***Odour***	***Foam***	***Weather***	***Cloud Cover***	***Wind Speed***
						Tick which box best represents conditions - elaborate under comments if need be						
Seddon Pond 1 OXP-026						*Green*	*Light*	*None*	*None*	*Sunny*	*0/8*	*Light*
						Brown	*Medium*	*Slight*	*Slight*	*Cloudy*	*3/8*	*Medium*
						Yellow	*Dark*	*Moderate*	*Moderate*	*Overcast*	*6/8*	*Strong*
						Other	*Other*	*Strong*	*Strong*	*Rain*	*8/8*	*Direction*
Seddon Pond 6 OXP-020						*Green*	*Light*	*None*	*None*	*Sunny*	*0/8*	*Light*
						Brown	*Medium*	*Slight*	*Slight*	*Cloudy*	*3/8*	*Medium*
						Yellow	*Dark*	*Moderate*	*Moderate*	*Overcast*	*6/8*	*Strong*
						Other	*Other*	*Strong*	*Strong*	*Rain*	*8/8*	*Direction*
Seddon Ponds : Comments / Visual Observations												

Sewerage Ponds Quarterly Operational Monitoring

Hilltop Reference Name : *Sewage Operational, Quarterly, Seddon* ***(Week of _____- Week ____)*** *Sample Person:*

Site Code	Hilltop Sample #	Date & Time	Dissolved Oxygen	pH	Temp	BOD	TSS	Conductivity	Total N	NH3/N	Total Phosphorus	Dissolved reactive Phosphorus	Faecal Coliforms	Ecoli
Outlet of Pond 6														

Seddon Ponds : Comments / Visual Observations

Site Code	Hilltop Sample #	Date & Time	Dissolved Oxygen	pH	Temp	Total BOD	TSS	Conductivity	Total N	Nitrate	Ammonia	Ammoniacal Nitrogen	Dissolved inorganic nitrogen	Total Phosphorus	Dissolved reactive Phosphorus	Ecoli	Faecal Coliforms
Starborough Creek - DS sampling pont																	
Starborough Creek - US Sampling Point																	

Starborough Creek : Comments / Visual Observations

Note that DO to be sampled between 9.30am to 2.30pm.

Appendix C – Resource Consent Conditions U170260

Refer to document CM 18107719

Decision on Application for Resource Consent U170260 dated 24 May 2018

Attachment: Conditions

1. The activity shall be in general accordance with resource consent application U170260, received by Council on 21 April 2017 and the revised application received by Council on 31 May 2017.

2. The discharge shall not exceed 570 cubic meters per day (average over any one week) of treated wastewater from the Seddon Sewage Treatment Plant.

3. The consent holder shall measure the volume of wastewater discharged to Starborough Creek on a daily basis. The results shall be provided to the District Council as part of the reporting required under Condition 16 or on request.

4. The discharge of treated wastewater through the outfall shall not cause any of the following effects outside of the 300 metre mixing zone:

    a) A change in the temperature of the receiving water of more than 3 degrees Celsius

    b) Any significant adverse effects on aquatic life as assessed by the survey required by Condition 14 of this consent

    c) There shall be no production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials

5. In the event one of the above effects listed in 4(a) – (c) above is identified, the consent holder shall:

    a) Have a suitably qualified person retest/reinspect no later than 48 hours after first identifying the effects to confirm there is an effect;

    b) If the retesting/reinspection confirms identification of an effect listed in 4(a) to (c), the consent holder shall inform the Council's Compliance Manager within 24 hours of receiving the results and provide the following information:

        i. The steps that are to be taken to identify the cause of the effect; and

        ii. The timeframe for investigating the cause of the effect.

    c) If the investigation into the cause of the effect confirms that the discharge:

        i. Is the cause, the consent holder shall inform the Council's Compliance Manager of the best practicable measures that are going to be undertaken to avoid, remedy or mitigate the effects and the timeframe for implementing the measure(s), to the satisfaction of Council's Compliance Manager; or

        ii. Is not the cause, the consent holder shall inform the Council's Compliance Manager of the outcomes of the investigation within 48 hours of receiving the results of the investigation.

6. The consent holder shall have a suitably trained person take weekly Dissolved Oxygen and pH readings at the outlet of Pond 6. If the weekly Dissolved Oxygen readings identify that there is a declining trend in Dissolved Oxygen (for samples taken between 11am and 2pm), then the consent holder shall take best practicable measures to improve those Dissolved Oxygen concentrations. Best practicable

measures may include, but shall not be limited to, the measures identified in the Council's Operation and Management Plan required under condition 8.

7. The consent holder shall take grab samples of the wastewater from the outlet of Pond 6 every three months and analyse the samples for the following:

    a) Biochemical oxygen demand

    b) Total suspended solids

    c) Conductivity

    d) Total nitrogen

    e) Ammonia-Nitrogen

    f) Total phosphorus

    g) Dissolved reactive phosphorus

    h) E. coli

    i) Faecal coliforms

    j) Dissolved oxygen

    k) Temperature

    l) pH

8. The consent holder shall prepare and submit an Operation and Management Plan (OMP) to the Council's Compliance Manager within two months of commencement of the consent. The objective of the OMP is to ensure that the operation and management of the Seddon Sewage Treatment Plant complies with the conditions of the resource consent. The OMP shall document all relevant site management monitoring and operational procedures and contingency plans.

9. The consent holder shall operate the Seddon Sewage Treatment Plant in accordance with the OMP (including any new version of, or amendment to the OMP). The consent holder shall ensure that any amendments to the OMP, or new versions of the OMP are provided to the Council's Compliance Manager.

10. The consent holder shall carry out a programme of receiving environment monitoring for the duration of the consent as follows:

    a) Water samples shall be taken by a suitably trained person on a three monthly basis at the following locations:

        i. Upstream: where State Highway 1 crosses Starborough Creek

        ii. Downstream: approximately 300m of the discharge point (or as close to that point as practical taking into account the ephemeral nature of Starborough Creek)

    b) Samples shall be analysed for:

i. Total biochemical oxygen demand

ii. Total suspended solids

iii. Conductivity

iv. Nitrate

v. Total nitrogen

vi. Ammonia

vii. Ammoniacal nitrogen

viii. Dissolved inorganic nitrogen

ix. Total phosphorus

x. Dissolved reactive phosphorus

xi. E. coli

xii. Faecal coliforms

xiii. Dissolved oxygen (samples to be taken between 9.30am – 2.30pm)

xiv. Temperature

xv. pH

c) The concentration of Dissolved-Oxygen in the downstream receiving water shall not drop below 6 mg/L unless upstream is less than 6 mg/L. If the concentration of dissolved oxygen is below 6mg/L, then the consent holder shall take the actions set out at condition 13.

d) If the downstream concentration of Dissolved Oxygen is below 4mg/L, then the consent holder shall take the actions identified at condition 13, regardless of what the upstream concentration is.

11. Dissolved Oxygen shall be measured continuously by a suitably trained person (using a Dissolved Oxygen logger) at the upstream and downstream locations specified in condition 10(a) for two separate periods of seven days each summer for the term of the consent. The weekly measurements shall be undertaken when flows are low to determine the Dissolved Oxygen 7-day mean minimum and the 1-day minimum.

12. Based on the continuous monitoring data collected under condition 11:

a) if the 7-day mean dissolved oxygen minimum at the downstream site is below 6mg/L, or the 1-day dissolved oxygen minimum is below 5mg/L, the consent holder shall take the actions identified at condition 13 unless upstream is also below those concentrations; or

b) if the downstream Dissolved Oxygen concentration is below 5mg/L for the 7-day mean Dissolved Oxygen minimum, or 4mg/L for the 1-day Dissolved Oxygen minimum, the consent holder shall take the actions identified at condition 13 regardless of the upstream concentration.

13. If Dissolved Oxygen concentrations are below the limits identified in conditions 10(c), 10(d) and 12, then the consent holder shall:

    a) At the outlet of Pond 6 either:

        i. Take spot measurements of Dissolved Oxygen during the day and at dawn; or

        ii. Operate a continuous logger;

        over a period of 72 hours to determine the daily Dissolved Oxygen minimum;

    b) If the daily Dissolved Oxygen minimum identifies that Dissolved Oxygen at the outlet of Pond 6 falls below 5mg/L at any time during the 72 hour period, then the consent holder shall as soon as possible:

        i. take best practicable measures, which may include, but are not limited to, an aerator or recirculation of water from pond 6 to pond 5, to improve the Dissolved Oxygen concentration in Pond 6; and

        ii. at the same time the best practicable measures are being implemented, continuously log Dissolved Oxygen at the downstream site specified at condition 10(a)(ii) and at the outlet of Pond 6 over a minimum of 72 hours to confirm whether there is an improvement in the Dissolved Oxygen concentration.

    c) The results of the retesting shall be provided to the Council as part of the annual written monitoring report under condition 16 along with a summary by a suitably qualified person of the efficacy of any measures undertaken to improve Dissolved Oxygen concentration in Pond 6 and at the downstream testing site.

14. Within 24 months of the grant of the consent the consent holder shall undertake an ecological assessment of the effect that the discharge is having on Starborough Creek. The assessment shall be undertaken by a suitability qualified and experienced ecologist. The assessment shall include but not be limited to the effect of the discharge on water quality and instream ecology. A copy of the ecological assessment shall be provided to the Council's Compliance Manager.

15. The results of the monitoring required under conditions 7, 10 - 11 shall be provided to the Council in accordance with Condition 16 or on request.

16. The consent holder shall annually from the commencement of this consent and for the period 1 July to 30 June of each year, provide to the Council a written monitoring report that:

    a) Includes all sampling and monitoring results and records;

    b) Includes any retesting results and annual summary that may have been required in relation to Dissolved Oxygen concentration under condition 13;

    c) Provides an analysis of sampling and monitoring results and trends and actions taken including any re-testing under condition 5;

d) Includes details of any complaints received regarding the operation of the treatment plant and how they have been responded to and, where necessary, the actions undertaken to address the cause of the complaint; and

e) Summarises the state of compliance with the conditions of these consents.

17. By August of each year, the consent holder shall provide an update to the Council and Te Rūnanga o Kaikōura of land disposal investigation undertaken and progress made on implementation.

18. The consent holder shall lodge any resource consent applications and (if necessary) notices of requirement to implement the option identified prior to the expiry of these consents.

19. A warning sign highlighting the presence of the discharge shall be maintained on the bund where Starborough Creek exits the gorge and enters the Awatere River bed warning people of the treated wastewater discharge.

20. The Consent Holder shall ensure that all structures and works authorised under this consent are maintained in a structurally sound condition at all times to the satisfaction of the Council.

21. The consent holder shall advise the Compliance Manager, Marlborough District Council, the Medical Officer of Health and Te Rūnanga o Kaikōura as soon as practicable and, as a minimum requirement, within 48 hours of any accidental discharge, plant breakdown or other contingency (Incident) which is likely to result in an abnormal discharge quality.

22. Within seven working days of an Incident occurring, the consent holder shall submit a written report describing the Incident, the reasons for it occurring, its consequences (including the nature of any complaints), the measures taken to remedy or mitigate its effects, and any measures taken to prevent a recurrence of the Incident, including any changes to operating procedures to the Compliance Manager, Marlborough District Council, and Te Rūnanga o Kaikōura.

23. The consent holder shall notify the Compliance Manager, Marlborough District Council, in writing of any maintenance or upgrade works to the plant which may increase discharges of contaminants to air on a short term basis and explain any processes in place to manage the potential effects.

24. The consent holder shall maintain and keep a Complaints Register for all complaints made about the treatment and discharge operations received by the consent holder. The Register shall record:

a) The date, time and duration of the event/incident that has resulted in the complaint;

b) The name and address of the complainant;

c) The location of the complainant when the event/incident was detected;

d) The outcome of all investigations including site and boundary surveys following notification of the issue, including an assessment as to whether the odour was likely to have been of an intensity or nature that was offensive;

e) The possible cause of the incident;

f) The weather conditions and wind direction at the site when the incident allegedly occurred, if significant to the complaint; and

g) Any corrective action undertaken by the consent holder in response to the complaint.

25. The Complaints Register shall be made available to the Council at all reasonable times.

26. Complaints which may indicate non-compliance with the conditions of this resource consent shall be forwarded to the Compliance Manager, Marlborough District Council, within 5 working days of the complaint being received.

27. The Marlborough District Council may, during June or July of each year, or within 2 months of receiving the annual report required under Condition 16 serve notice of its intention to review and amend or add to the conditions of this resource consent under section 128 of the Resource Management Act 1991 for the purpose of:

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

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

c) Requiring the Consent Holder to carry out monitoring in addition to or instead of that required by the resource consent; or

d) Addressing any issues identified in the annual reports submitted under Condition 16 of this resource consent.

Appendix D – Check Sheets

Appendix D1 – Plant Inspection Check Sheet

Plant Inspection Check Sheet

Date _____ **Time** _____ **Name** _____

Wind[1] (Note if it is calm) _____

Wind Direction (direction from which the wind comes**)** _____

Weather conditions sunny overcast raining

Table 1
Plant Check Sheet

Location	*Unusual Odours[3] Yes/No*	*If Yes Describe*	*Apparent Reason for Odour/Source*	*Impact Rating (A-E)*	*Aerosols[4] Yes/No*	*Excess Noise Yes/No*
Screen (when installed)						
Screenings press (when installed)						
Spillages						
Pond 1						
Pond 2[2]						
Pond 3[2]						
Pond 4[2]						
Pond 5[2]						
Pond 6						

1 Wind speed (but not direction) and air temperature are measured on site and returned by SCADA to Blenheim base.

2 Information only required for these ponds if there is an issue with performance of the ponds

3 Refer to following page odour character descriptors and odour impact rating system

4 Aerosols not considered an issue at SSTP

Health and Safety issues

Any other comments

Recommended Actions

Raise Issues with other staff

Odour Character Descriptors
Herbal, green, cut grass
Woody, resinous
Burnt, smoky
Chemical
Sour, acrid, vinegar
Like blood, raw meat
Rubbish
Compost
Silage
Sickening
Musty, earthy, mouldy
Sharp, pungent, acid
Oily, fatty
Like petrol, solvent
Putrid, foul, decayed
Rancid
Sulphidic
Dead animal
Faecal (like manure)
Sewer odour

Odour Intensity	
Extremely strong	A
Very strong	B
Strong	C
Distinct	D
Weak	E
Very weak	F
Not perceptive	G

Odour Impact	Impact Rating
The odour can be detected but is not annoying under normal conditions	A
The odour can be detected but is not annoying unless it is continuous	B
The odour is moderately strong and is annoying if it is continuous or if its occurrence is very frequent	C
The odour is moderately strong and is annoying if it occurs for periods of more than 5 to 10 minutes. Shorter infrequent occurrences are not annoying	D
The odour is strong and is annoying even in periods of short duration	E

Appendix D2 – Field Odour Survey Sheet

Field Odour Survey Sheet

Date _____ **Name** _____ **Location** _____

Time Start _____ **Time Finish** _____

Overall Impact Rating (A to E on this table) _____

Likely Source of Odour _____

Time (seconds)	*Intensity*	*Wind Direction*	*Wind Strength*	*Character*
0.00				
0.10				
0.20				
0.30				
0.40				
0.50				
1.00				
1.10				
1.20				
1.30				
1.40				
1.50				
2.00				
2.10				
2.20				
2.30				
2.40				
2.50				
3.00				
3.10				
3.20				
3.30				
3.40				
3.50				
4.00				
4.10				
4.20				
4.30				
4.40				
4.50				
5.00				
5.10				

Odour Character descriptors

Herbal, green, cut grass
Woody, resinous
Burnt, smoky
Chemical
Sour, acrid, vinegar
Like blood, raw meat
Rubbish
Compost
Silage
Sickening
Musty, earthy, mouldy
Sharp, pungent, acid
Oily, fatty
Like gasoline, solvent
Putrid, foul, decayed
Rancid
Sulphidic
Dead animal
Faecal (like manure)
Sewer odour

Odour Intensity	***Intensity***
Extremely strong	A
Very strong	B
Strong	C
Distinct	D
Weak	E
Very weak	F
Not perceptive	G

Time (seconds)	Intensity	Wind Direction	Wind Strength	Character
5.20				
5.30				
5.40				
5.50				
6.00				
6.10				
6.20				
6.30				
6.40				
6.50				
7.00				
7.10				
7.20				
7.30				
7.40				
7.50				
8.00				
8.10				
8.20				
8.30				
8.40				
8.50				
9.00				
9.10				
9.20				
9.30				
9.40				
9.50				
10.00				

Odour Character descriptors

Odour Impact	*Impact Rating*
The odour can be detected but is not annoying under normal conditions	A
The odour can be detected but is not annoying unless it is continuous	B
The odour is moderately strong and is annoying if it is continuous or if its occurrence is very frequent	C
The odour is moderately strong and is annoying if it occurs for periods of more than 5 to 10 minutes Shorter infrequent occurrences are not annoying.	D
The odour is strong and is annoying even in periods of short duration.	E

*Use the Beaufort scale below

Extract from Beaufort Scale for use on Land

Knots	*Description*	*Specifications for use on Land*
0 – 1	Calm	Calm; smoke rises vertically
1 – 3	Light air	Direction of wind shown by smoke drift, but not be wind vanes
4 – 7	Light breeze	Wind felt on face; leaves rustle; ordinary vanes moved by wind
8 – 12	Gentle breeze	Leaves and small twigs in constant motion; wind extends light flag
13 – 18	Moderate breeze	Raises dust and loose paper; small branches are moved.
19 –24	Fresh breeze	Small trees in leaf begin to sway; crested wavelets form on inlet waters.
25 – 31	Strong breeze	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty
32-38	Near Gale	Whole trees in motion; inconvenience felt when walking against the wind
39 – 46	Gale	Breaks twigs off trees; generally impedes progress.

Appendix D3 – Complaint Form

Complaint Form

Complaint Number _____ **Name of Person Responding to Complaint** _____

Date Complaint Received _____ **Time Complaint Received** _____

Information Required	***Details***
Type of complaint (odour, aerosol, noise)	
Source of complaint (MDC Regulatory or direct)	
Name of complainant	
Address of complainant	
Contact telephone of complainant	
Location where odour/aerosol/noise was noticed	
Time odour/aerosol/noise noticed	
Duration of odour/aerosol/noise (how long did it last)	
Description of odour (character and strength)	
Description of noise (tone, character volume)	
Wind direction and speed	
Weather conditions (sunny, raining, overcast, frosty)	
Date and time of plant check	
Details of any remedial action taken	
Date and time of field survey	
Are there other possible sources of odour/aerosol/noise	
If yes to above, has this been verified	
Date and time of follow up to complainant. Note if complaint referred from MDC Regulatory Dept contact details may not be available. Send response to relevant person in Council.	
Is further investigation required?	

Note: Complaints which may indicate non-compliance wih the conditions of the resource consent shall be forwarded the Planning and Development Engineer to ensure the compliance manager at MDC is notified within 5 working days of the complaint being received.

Appendix D4 – Noise Field Check Sheet

Noise Field Check Sheet

Type of Check (Noise)

Date _____ **Name** _____

Time _____ **Location** _____

Information Required	*Details*
Is noise apparent	
Describe noise	
Likely source of noise	
If source of noise is not SSTP has this been verified (yes/no, how)	
Wind strength	
Wind direction (direction wind comes from)	

Comments

W440-002-004-01
Record No. 18133517