



APPENDIX A

PDP Ltd response to Stantec (NZ) Ltd
request for clarification



APPENDIX B

Response to Stantec (NZ) Ltd request
for clarification – Issue ID 23

Issue ID23 Response

Table 17 below is an updated table from the Blue Sky Meats Ltd Morton Mains Processing Plant, Resource Consent Application and Assessment of Environmental Effects dated 30 June 2022. It has been updated in response to **Issue ID 23** from the Stantec (NZ) Ltd Request for Clarification (dated 31 October 2022). A new column has been added (proposed consent conditions) which identifies where the recommended mitigation, management and monitoring measures are contained within the consent conditions, where required.

Please note that the original information contained within this table from the application has not been updated, however where there has been changes to the proposed consent conditions, this has been noted in the newly added proposed consent condition column. Also note that this is intended to be a summary table only. The proposed consent conditions provide the detail of what is proposed.

Table 17: Summary of the Recommended Mitigation, Management and Monitoring Measures

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring	Proposed consent condition
Effects from the abstraction of Groundwater			
Effects on the groundwater resource.	Groundwater abstraction rates will be limited to:	➤ Monitor groundwater levels at each bore once each calendar month; and	➤ Condition 2 limits groundwater abstraction rates.
Effects on neighbouring bores.	➤ 1,500,000 litres per day; and ➤ 7,500,000 litres per week. And will be taken from the existing bores.	➤ Measure and report the daily and weekly abstraction from the bores in accordance	➤ Condition 1 specifies the bores from which groundwater will be abstracted. ➤ Conditions 3 and 4 specify how bores are to be constructed and maintained to prevent groundwater contamination.
Effects on surface water.			

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring	Proposed consent condition
<p>Effects on aquifer stability, seawater intrusion and groundwater quality.</p>	<p>The abstraction bores will be appropriately protected from groundwater contamination by:</p> <ul style="list-style-type: none"> ➤ The installation of a backflow prevention device to ensure water and/or contaminants cannot return to the water source; ➤ Sealing the ground around the bore head to prevent foreign material, surface water, spillage or other leakage entering the space between the casing and the wall of the borehole; ➤ Sealing the top of the casing to prevent the entry of contaminants into the casing; and ➤ Securing the bore head with stock protection measures e.g., fencing. 	<p>with the Water Measurement Regulations.</p>	<ul style="list-style-type: none"> ➤ Condition 5 specifies groundwater level monitoring requirements. ➤ Conditions 6 to 10 specify how groundwater abstraction records are to be obtained and reported.
<p>Effects from the discharge of treated wastewater, biosolids, stockyard solids and paunch to land</p>			

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring	Proposed consent condition
<p>Effects on soil.</p>	<ul style="list-style-type: none"> ➤ Limit the irrigation rates to within the measured capacity of the soils on the site to minimise hydraulic loading effects; ➤ Managing soil chemistry effects by: <ul style="list-style-type: none"> ○ Undertaking biosolids loading to target paddocks with low soil fertility and quality indicators (low Olsen P levels); and ○ Managing excess sodium, potassium and Exchangeable Sodium Percentage (ESP) through soil additives. ➤ Limiting the oil and grease concentration of the treated wastewater discharged to soil to assist in maintaining soil infiltration rates. 	<ul style="list-style-type: none"> ➤ Monitoring soil health within the irrigation area and a control site for a range of parameters including nutrients and ESP at least once per year; ➤ Testing soil infiltration rates at least once per year at the same sites as the above; and ➤ Monitoring the actual levels of heavy metal accumulation on an ongoing basis by taking representative samples of the heavy metals outlined above on a five-yearly interval. 	<ul style="list-style-type: none"> ➤ Condition 6 limits hydraulic application rates. ➤ Condition 21 stipulates the requirements for annual soil monitoring within the irrigation area and a control site. ➤ Condition 22 provides an ESP target for soil. ➤ Condition 13 limits oil and grease application concentrations. ➤ Condition 23 specifies that action is required if ESP does not meet the required target. ➤ Condition 21(f) details the requirements for heavy metals sampling.

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring	Proposed consent condition
Effects on groundwater.	<ul style="list-style-type: none"> ➤ The nitrogen loading rate from wastewater irrigation will be limited; and ➤ Wastewater irrigation application rates will be limited. 	<ul style="list-style-type: none"> ➤ Quarterly sampling of groundwater bores for nitrogen leaching to confirm the expected improvement in groundwater quality; ➤ Ongoing monitoring of shallow groundwater for E.coli on the site; and ➤ Testing groundwater monitoring wells for heavy metals at five-yearly intervals. 	<ul style="list-style-type: none"> ➤ Conditions 9 and 12-1 specify nitrogen loading limits. ➤ Condition 6 limits hydraulic application rates. ➤ Condition 26 specifies quarterly sampling of groundwater, including the requirements for analysis of nitrogen and E.coli concentrations. ➤ Condition 27 specifies requirements for monitoring heavy metals in groundwater.
Effects on surface water.	<ul style="list-style-type: none"> ➤ The nitrogen and phosphorus loading rates from wastewater irrigation will be limited; ➤ Wastewater irrigation application rates will be limited; ➤ The establishment of riparian planting on all streams and drains on their land to act as a buffer to absorb excess phosphorus; and 	<ul style="list-style-type: none"> ➤ Monthly monitoring of the unnamed tributary of the south branch of the Waihopai River that flows through the wastewater discharge area for physio-chemistry and nutrients; and ➤ To maintain a conductivity meter downstream of the land treatment area to 	<ul style="list-style-type: none"> ➤ Conditions 9, 10 and 11 limit nitrogen and phosphorus application rates. ➤ Condition 6 limits hydraulic application rates. ➤ Condition 11 specifies the requirements for riparian planting. ➤ Condition 4 provides requirements for capping of subsoil drains within the irrigation area owned by BSM. ➤ Condition 18 specifies monitoring requirements for the tributary of the Waihopai River. Please note that proposed

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring	Proposed consent condition
	<ul style="list-style-type: none"> ➤ Underground drains will be capped within the BSM irrigation area. 	<p>continuously monitor electrical conductivity in the tributary.</p>	<p>monitoring requirements have changed from monthly to quarterly in the 18th August 2023 version of the proposed conditions.</p> <ul style="list-style-type: none"> ➤ Condition 19 specifies conductivity monitoring requirements in the tributary to the Waihopai River.
Ecological effects.	<ul style="list-style-type: none"> ➤ The nitrogen and phosphorus loading rates from wastewater irrigation will be limited; ➤ Wastewater irrigation application rates will be limited; and ➤ Implementing native riparian planting along all watercourses that run through the property to provide shading and greater habitat quality. 	<ul style="list-style-type: none"> ➤ Ecological monitoring on a five-yearly basis. 	<ul style="list-style-type: none"> ➤ Conditions 9, 10 and 11 limit nitrogen and phosphorus application rates. ➤ Condition 6 limits hydraulic application rates. ➤ Condition 11 specifies the requirements for riparian planting. ➤ Condition 29 specifies the requirements for ecological monitoring.
Effects on human health.	<ul style="list-style-type: none"> ➤ Operational management and physical methods used for irrigation / spreading to avoid staff contact with the wastewater; 		<ul style="list-style-type: none"> ➤ Condition 5 specifies buffer zones. ➤ Condition 43(f) requires that the Wastewater Farm Environmental Management Plan specify how irrigation will be managed to ensure there is no

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring	Proposed consent condition
	<ul style="list-style-type: none"> ➤ Minimising public contact with sprayed wastewater through the use of appropriate buffer zones; and ➤ Ensuring irrigation does not occur near a downwind boundary during windy conditions. 		detectable spray drift beyond the property boundary.
Effects on stock health.	<ul style="list-style-type: none"> ➤ Maintaining a minimum stock withholding period of 14 days following discharge event. 	<ul style="list-style-type: none"> ➤ None required. 	<ul style="list-style-type: none"> ➤ Condition 8 specifies stock withholding requirements.
Effects from the take of groundwater for dewatering			
Effects on groundwater.	<ul style="list-style-type: none"> ➤ The groundwater will be taken passively via the installed sub-surface drainage. 	<ul style="list-style-type: none"> ➤ None required. 	<ul style="list-style-type: none"> ➤ Condition 1 specifies that groundwater can only be taken passively via the subsoil drainage system.
Effects from the discharge of land drainage water and stormwater to water			
Effects on surface water.	<ul style="list-style-type: none"> ➤ No adverse effects requiring mitigation identified. 	<ul style="list-style-type: none"> ➤ Annual sampling of land drainage water and water from the drain upstream of the 	<ul style="list-style-type: none"> ➤ Condition 2 specifies monitoring requirements for drainage water and water from the open drain upstream of the drainage water discharge point. Please note that the sampling frequency has been

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring	Proposed consent condition
		discharge point for contaminants.	<p>increased from annually to quarterly in the 18th August 2023 version of the proposed conditions.</p> <ul style="list-style-type: none"> ➤ A new condition (Condition 6) has been added to the 18th August 2023 version of the proposed conditions to ensure the quality of the stormwater discharge is acceptable prior to being discharged to surface water for the first time. ➤ Additional stormwater quality monitoring is proposed in Condition 2 the 18th August 2023 version of the proposed conditions.
Air Quality Effects			
Carbon emissions from combustion plant (boilers).	<ul style="list-style-type: none"> ➤ Decommission the existing HWB boiler by August 2024; and ➤ BSM seeking to replace the rendering RSB boiler when a practicable alternative technology is available. A review of this is proposed every five years. 	➤ None required.	<ul style="list-style-type: none"> ➤ Condition 13 specifies when use of the HWB must cease. ➤ Condition 14 specifies review requirements for the ongoing use of the RSB.

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring	Proposed consent condition
<p>Emission of contaminants from the combustion plant (boilers).</p>	<ul style="list-style-type: none"> ➤ Limiting boiler particulate matter emissions; ➤ Reducing boiler particulate matter emissions with the decommissioning of the existing HWB boiler by August 2024; and ➤ Boiler control and maintenance, including: <ul style="list-style-type: none"> ○ 12-monthly servicing of each boiler with reports provided to Environment Southland; ○ Tuning boilers to ensure optimal fuel combustion, minimum fuel use and minimum particulate emissions; and ○ Discharging emissions via a 20 m high stack for the RSB and an 18.6 m stack for the HWB to ensure adequate dilution and dispersion. 	<ul style="list-style-type: none"> ➤ Undertaking emissions testing of the RSB boiler once every year for the first three years to ensure compliance with emission limits with reports provided to Environment Southland; ➤ After three continuous years of compliance with the particular matter discharge limit; testing of the RSB will be undertaken every three years; ➤ Undertaking emissions testing of the HWB boiler once every year until it is decommissioned to ensure compliance with emission limits with reports provided to Environment Southland; ➤ Monitoring opacity of emissions to ensure 	<ul style="list-style-type: none"> ➤ Condition 6 limits boiler particulate emissions. Please note that the limits have been reduced in the 18th August 2023 version of the proposed conditions. ➤ Condition 13 specifies when use of the HWB must cease. ➤ Condition 12 specifies boiler maintenance requirements. ➤ Condition 4 specifies requirements for boiler stack heights. ➤ Conditions 8, 9 and 10 specify boiler testing requirements. ➤ Condition 11 specifies that boiler testing results must be provided to Environment Southland. ➤ Condition 3 specifies emission opacity requirements. ➤ Condition 5 specifies coal quality requirements.

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring	Proposed consent condition
		<p>compliance with consent limits; and</p> <ul style="list-style-type: none"> ➤ Carrying out regular review of the Newvale coal to ensure compliance. 	
<p>Emission of objectionable odours from processing plant (rendering and blood drying).</p>	<p>An Air Discharge Management Plan (ADMP) that includes numerous controls and management processes including:</p> <ul style="list-style-type: none"> ➤ Ensuring material is processed and rendered as soon as practicable; ➤ Collecting all point sources of vapour from the rendering and blood drying plant and venting this to a condenser and then the plant biofilter; ➤ Directing all rendering and blood drying room air to the biofilter for treatment; ➤ Ensuring sufficient changes of rendering building air per hour; 	<ul style="list-style-type: none"> ➤ Monthly monitoring of moisture and pH conditions to ensure the biofilter health is maintained. ➤ Undertaking daily visual checks of the biofilter; ➤ Checking for signs of biofilter bed degradation e.g. slumping; ➤ Ensuring biofilter bed moisture levels are maintained and applying water to the bed if necessary; ➤ Monitoring inlet humidity and temperature continuously; 	<ul style="list-style-type: none"> ➤ Conditions 31, 32 and 33 specify ADMP requirements. ➤ Condition 16 specifies rendering material quality requirements. ➤ Conditions 17 and 18 specify requirements for treatment of air from the rendering process. ➤ Condition 18 specifies that the biofilter shall be capable of treating all air from the rendering building including the point sources. Please note that this condition has been amended in the 18th August 2023 version of the proposed conditions. ➤ Condition 31(h) specifies that the ADMP include details of how emissions will be contained within the rendering building.

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring	Proposed consent condition
	<ul style="list-style-type: none"> ➤ Minimising external door opening times; and ➤ Undertaking daily housekeeping and thorough cleaning; 	<ul style="list-style-type: none"> ➤ Monitoring pressure drop over the biofilter monthly; ➤ Regularly upgrading the biofilter with new bark and regular checking of the air distribution; and ➤ Daily checking downwind for the presence of recognisable rendering odour. 	<ul style="list-style-type: none"> ➤ Condition 22 specifies cleaning requirements for the meat processing and rendering plant. ➤ Conditions 19 and 20 specify monitoring requirements and performance targets for the biofilter.
<p>Emission of odour from the Wastewater Treatment and Disposal System.</p>	<ul style="list-style-type: none"> ➤ An Air Discharge Management Plan to detail actions taken to minimise odour emissions from the site; ➤ Management and monitoring of the creation and discharge of odours from WWTP under the requirements of the WWTP Operation and Maintenance Manual and Wastewater Farm Environmental Management Plan. This includes management practices such as regular inspections and 	<ul style="list-style-type: none"> ➤ Regular inspections and maintenance of equipment in accordance with the Air Discharge Management Plan 	<ul style="list-style-type: none"> ➤ Conditions 31, 32 and 33 specify ADMP requirements. ➤ Conditions 23 and 24 specify requirements for the operation of an anaerobic pond gas flare and back-up biofilter. ➤ A Wastewater Farm Environmental Management Plan is required by Condition 43 of the permit to discharge treated wastewater, stockyards solids, paunch, wastewater activated sludge and stormwater to land.

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring	Proposed consent condition
	<p>maintenance of equipment, daily cleaning, contingency methods for plant malfunctions and training procedures;</p> <ul style="list-style-type: none"> <li>➤ Operation of the biogas flare as the primary treatment measure for biogas from the anaerobic pond, with a biofilter available for contingency purposes in the event that the flare is not working; and <li>➤ Utilisation of the Wastewater Farm Environmental Management Plan. 		
<p>Emission of odour from wastewater irrigation.</p>	<p>A Wastewater Farm Environmental Plan that includes numerous controls and management processes including:</p> <ul style="list-style-type: none"> <li>➤ Twice-daily checks of irrigation operation and maintaining plant equipment to a high standard; and <li>➤ Appropriately managing the WWTP to ensure the 	<ul style="list-style-type: none"> <li>➤ Reviewing prevailing winds directions before irrigating and adjusting irrigator speeds in response to climatic and soil conditions. 	<ul style="list-style-type: none"> <li>➤ Conditions 31, 32 and 33 specify ADMP requirements. <li>➤ A Wastewater Farm Environmental Management Plan is required by Condition 43 of the permit to discharge treated wastewater, stockyards solids, paunch, wastewater activated sludge and stormwater to land.

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring	Proposed consent condition
	wastewater does not become anaerobic.		



APPENDIX C

Beca response to Specialist
Environmental Services



21 Pitt Street,
PO Box 6345, Auckland,
1141, New Zealand
T: +64 9 300 9000 // F: +64 9 300 9300
E: info@beca.com // www.beca.com

Blue Sky Meats
729 Woodlands, Morton Mains Road
RD1
Invercargill 9871

24 July 2023

Attention: Steve Paynter

Dear Steve

External Review Air Discharge Questions

Environment Southland has contracted the review of the air discharge consent application made by Blue Sky Meats (Blue Sky) to John Iseli of Specialist Environmental Services Ltd. John has asked for clarification on a number of aspects of the application as discussed in the following sections.

1.1 Critical Spares

1.1.1 Information Requested

Please describe the critical spare equipment held on site for odour control at the rendering plant and the WWTP.

1.1.2 Comment

Blue Sky has advised that for the rendering department, the key contingency measure for a breakdown situation or power failure is taking product off-site for processing elsewhere, if an issue is unlikely to be resolved within 48 hours. No specific list of critical spare equipment is held for the rendering plant.

There is aeration redundancy in both the Sequential Batch Reactor (SBR) and irrigation lagoon of the Wastewater Treatment Plant (WWTP) if there is an aerator failure. There are 3 aerators in the SBR when typically, only two are needed and two aerators in the irrigation lagoon when only one is typically needed (if wastewater irrigation doesn't occur for more than 48 hours). There is a regular maintenance schedule in place for the aerators.

Table 6 of the Wastewater Treatment Plant Operation and Maintenance Manual (attached) lists contingency and response procedures that have been updated to provide guidance to Blue Sky Meats on measures that need to be undertaken in the event of power failure, to ensure that potential impacts from odour are appropriately managed. These include adjusting the volumes stored in each pond using a fuel powered pump, preventing wastewater from moving from the anaerobic lagoon to the SBR and operating a small aerator with a generator. There is redundancy in all the other pump and aerators used in the plant. Blue Sky has a maintenance programme for the aerators and they are greased every 8000 hrs.

Odoriferous air from the covered anaerobic pond would also discharge to the WWTP biofilter, rather than the flare.

**make
everyday
better.**

There are no critical spares listed for the biogas flare in the O&M Manual, but Blue Sky will be carrying a spare flame ignition unit and motor for the flame fan as part of their maintenance plan. In addition, proposed Condition 23 of the air discharge consent requires Blue Sky to vent biogases to the WWTP biofilter if the flare isn't operating.

In the event of prolonged power failure, the main plant won't be processing, so the effluent levels won't be a problem.

1.2 Back-up Generator

1.2.1 Information Requested

Is an emergency generator maintained on site to allow continued odour control in the event of a power outage? What has been the frequency and duration of any power outages at the plant in recent years?

1.2.2 Emergency Generator Comment

The site is fed by two power supplies, the Kennington feeder typically supplies the plant and the Edendale Feeder typically supplies rendering and wastewater treatment. In the event of a failure of one supply, changes can be made to how electricity is distributed across the site depending on where the priority need is. Blue Sky Meats note that preserving chilled and frozen product is a priority. As discussed in the Section above, the WWTP can be managed during power failures so that odour does not become a problem.

The contingency for the WWTP during a power outage is discussed in Section 1.1.2 of this letter.

Power Outages Comment

Blue Sky advises that power outages are common but are usually not for extended periods of time. Records from the provider Powernet, for the last 2 years, show that power outages are generally quite short. Tables 1 and 2 show the power outages over the period – 01 February 2021 to 30 April 2023 for the two feeders to the site.

Table 1. Outages from the Kennington 5 Feeder ICP 0008001316TP078

Date	Time Off	Time On	Total Time Off
20 April 2023	05:13am	05:14am	1 minute
17 March 2023	15:38pm	16:03pm	5 minutes
14 November 2022	01:38am	01:39am	1 minute
15 September 2022	07:07 am	07:08 pm	1 minute
5 August 2022	14:37 pm	12:10 pm	1293 minutes (21 hours 33 min)
3 May 2022	14:54 pm	14:55 pm	1 minute
27 February 2022	00:43 am	00:44 am	1 minute
28 December 2021	22:45 pm	22:46 pm	1 minute
4 November 2021	08:02 am	08:03 am	1 minute
1 October 2021	18:54 pm	19:49 pm	55 minutes
29 June 2021	23:07 pm	00:18 am	71 minutes
18 March 2021	16:21 pm	17:11 pm	50 minutes
13 February 2021	00:29 am	00:30 pm	1 minute

Table 2. Outages from the Edendale Feeder ICP 0008001315TPCB8

Date	Time Off	Time On	Total Time Off
8 November 2022	15:39	17:23	104 minutes
15 September 2022	06:05am	07:40	95 minutes
16 August 2022	17:26 pm	17:32 pm	6 minutes
27 February 2022 (planned)	09:00am	15:00pm	253 minutes (4 hours 13 mins)
23 January 2022 (planned)	09:00am	15:00pm	360 minutes (6 hours)
12 January 2022	06:30	07:48	78 minutes
4 November 2021	08:02 am	08:03 am	1 minute
1 October 2021	18:54 pm	19:49 pm	55 minutes
29 June 2021	23:07 pm	00:18 am	71 minutes
18 March 2021	16:21 pm	17:11 pm	50 minutes
13 February 2021	00:29 am	00:30 pm	1 minute

1.3 Biofilter Sizing

1.3.1 Information Requested

Based on the information provided by Blue Sky and an assumed 1 m media depth, the air loading rate to the biofilter is approximately 79 m³/hr of air per m³ of media. This loading rate is relatively high by current design standards for a biofilter that treats both building air and point source extraction. Please describe potential options available to improve odour treatment if required in future, such as expansion of the biofilter.

1.3.2 Comment

Based on the design information, the design loading rate is higher than the values considered suitable in guidance documents below, which consequently makes for a lower empty bed residence time (EBRT) as well.

The following biofilter design information sources have been reviewed:

- Biotechnology for Odor and Air Pollution Control, Shareefdeen & Singh, 2005 (Biotech Odour)
- German standard (VDI 3477) on biological waste gas purification biofilters, 2004
- University of Minesota Biosystems and Agricultural Engineering Update, 2004 (Biosystems Ag).
- UK Environment Agency Biofilter performance and operation as related to commercial composting, 2013 (Env Agency)
- Auckland Council Technical Publication TP152

On 23 February 2023, the air flow to the biofilter was measured at 5.1 m³/s. The flow to the biofilter was monitored again on 21 May 2023 which resulted in a flow of 8.041 m³/s. The key design values at these different flows are summarised in Table 3.

Table 3. Current Biofilter Design

Date	Unit	20/04/2023	17/05/2023
Diameter of Stack	Dstk (m)	1.20	1.41
Velocity in stack	Ustk (m/s)	4.51	5.15
Stack flow	Q(m ³ /s)	5.100	8.041
Residence Time	s	60	60
Bed Depth	m	1	1
Area Required	m ²	306.00	482.49
length one side	m	32	32
length other side	m	32	32
Area Chosen	m ²	1024	1024
Actual Biofilter Volume	m ³	1024	1024
Actual Residence Time	s	200.8	127.3
Actual Residence Time	min	3.3	2.1
Actual biofilter loading rate	m ³ /hr/m ²	17.9	28.3
Rendering plant building volume	m ³	6360	6360
Extraction volume flow	Q(m ³ /hr)	18360	28949
Air Changes per hour	per Hour	2.9	4.6

The original air flow to be treated by the biofilter was calculated on the basis that the ventilation rates from the Rendering Plant would provide 12 air changes per hour (ACH). However, while there is now less air extracted from the plant, the number of ACH is still adequate for staff working in the area, as the point sources are directly extracted which minimises the production of fugitive emissions. If the pressure drop was lower in the biofilter, it is likely that the air flow would increase. This is discussed further below.

There is guidance around biofilter sizing which is summarised in Table 4.

1.3.3 Biofilter Monitoring Results

- The pH monitoring results of the biofilter media from October 2019 to April 2023 ranged from 3.7 to 6.6.
- The pressure drop across the media has been measured in May 2023 to be 220 mm wg.
- Two moisture tests were undertaken on two different parts of the biofilter media on 24 May 2023 and the results were 45.3% and 42.4%.
- The temperature of the biofilter inlet air was monitored from 24 March to 24 May 2023 and ranged from 15 – 32°C.

Should there be any issues in the future regarding the biofilter not treating odour effectively, there is a good amount of space available to the northwest for expansion (as can be seen in Figure 1.)



Figure 1. Biofilter Location (within the red rectangle)

Table 4. Recommended Biofilter Design and Operating Conditions

Parameter	Biotech Odour	VDI 3477	UK Environment	Biosystems Ag	Auckland Council	Blue Sky Original Design, 22.5 m ³ /s	Blue Sky, 5.1 m ³ /s	Blue Sky, 8.041 m ³ /s
Empty Bed Residence Time, s	Soil bark filter 72-120s	-	15-60s	5 – 10s for H ₂ S	-	45s	201 s	127 s
Biofilter Loading rate,	-	100-150 m ³ /hr per m ² or 40-100 m ³ /hr per m ³	5 – 500 m ³ /hr per m ²	Calculated based on residence time	<50 m ³ /hr per m ²	80 m ³ /hr per m ² 80 m ³ /hr per m ³	18 m ³ /hr per m ²	28 m ³ /hr per m ²
Bed depth, m	-	>1	1 – 1.5	-	>=1.0	1.0	1.0	1.0
Temperature, °C	40°C max short peaks to 45°C	5 – 35°C, 40°C max	15 – 40°C	21 – 32°C	35°C max			Currently <32°C
Pressure mm wg	80-150 mm wg	No specific values	80-150 mm wg	Calculated	<150 mm wg			Currently ~220 mm wg
Moisture content %	40-60% wet weight basis	40-60% wet weight basis	60% wet weight basis	40-65% wet weight basis	50-60% wet weight basis			~45%
pH	6-8	No specific values	6-8	-	4-8			3.7-6.6

The pressure drop is a bit higher than the recommended values and Blue Sky is investigating whether any improvements to this can be made. Lime is periodically added to the biofilter to increase the pH.

As noted in Table 4 under Biosystems Ag, the recommended residence time for hydrogen sulphide is quite short. Natural odours such as hydrogen sulphide (which is expected to be a component of rendering odour) are treated quite easily and therefore the shorter design residence time wouldn't necessarily restrict the effectiveness of the biofilter. As the biofilter is an established unit, the level of treatment is easily measured by observing the residual odour near the biofilter.

**make
everyday
better.**

1.4 Air Flow to the Biofilter

1.4.1 Information Requested

Please confirm that the stated air flow rate to the biofilter takes into account recent improvements to air extraction in the rendering plant.

1.4.2 Comment

As discussed in Section 1.3.2, the air flow to the biofilter was measured on 23 February 2023 to be 5.1 m³/s. The flow to the biofilter was monitored again on 21 May 2023 which resulted in a flow of 8.041 m³/s.

1.5 Fugitive Emissions

1.5.1 Information Requested

Please describe measures used to minimise fugitive emissions of odour from the rendering plant building, including inspections for building tightness, automation of doors and monitoring of the pressure differential within the building.

1.5.2 Comment

Blue Sky procedures require the Rendering Plant external doors to be closed during operation (except for when people are passing through them). There is a rapid roller door on the raw material receival area that automatically opens and closes when a forklift is transporting raw material into the building. This is described in the Air Discharge Management Plan attached to this letter.

The ventilation system draws air from each room to the biofilter and make-up air is provided by grills on the outside walls of the building. Differential pressure is not routinely monitored but Blue Sky advises the extraction maintains a negative pressure within the building.

Doors, other than the raw material room rapid roller door, are only accessed a small number of times per day and are opened and closed manually with the assistance of electric motors. All personnel doors have door closers installed so the door will close after a person has walked through it.

A review of the building was done by Rendertech in 2018 and in regard to building tightness, the service penetration on the north wall of the raw material room was identified as an issue and fixed.

1.6 Extraction Vacuum

1.6.1 Information Requested

Please describe the methodology and frequency of monitoring of the pressure in the ducts from extraction sources.

1.6.2 Comment

No monitoring of negative pressure in the ducts that make up the point source extraction system is currently undertaken. However, Blue Sky has installed inspection ports to each of the ducts, where they can be safely accessed i.e. on the 2 presses, 1 on the cooker suction point and 1 on the blood suction point. A handheld manometer will be used on a quarterly basis, to ensure that negative pressure is being maintained in each of the ducts.

The air changes per hour within the rendering building are discussed in Section 1.3.2 of this letter.

1.7 Operations and Maintenance Manual

1.7.1 Information Requested

Please provide the most recent versions of the Wastewater O&M Manual, the Farm Environmental Management Plan and the ADMP.

1.7.2 Comment

A copy of the latest plans is attached to this letter.

1.8 Land Disposal Odour

1.8.1 Information Requested

Are any specific mitigation measures proposed to control odour effects associated with disposal of DAF sludge, stockyard solids and paunch grass to land.

1.8.2 Comment

The following buffer zones have been proposed in Condition 5 of the proposed discharge of treated wastewater, stockyards solids, paunch and biosolids to land consent application which will have the benefit of minimising exposure of sensitive receptors to odour:

"The treated wastewater, biosolids, stockyard solids and paunch authorised to be applied to land under this consent shall be applied no closer than:

c. 20 metres to any external property boundary or public road. The distance to a property boundary may be reduced with the written agreement of the adjacent property owner and occupier. A copy of this written agreement shall be provided to the Environment Southland Compliance Manager prior to disposal of treated wastewater, stockyard solids, paunch or biosolids occurring;

d. 100 metres to any residential dwelling, school, or marae (excluding any dwellings owned by the Consent Holder) unless the written agreement of the owner and occupier has been obtained. A copy of this written agreement shall be provided to the Environment Southland Compliance Manager prior disposal of wastewater, stockyard solids, paunch or biosolids occurring; "

For completeness it should be noted that DAF sludge is not spread to land.

In addition to the above, it is proposed that the material is not held for more than 48 hours before spreading to land.

1.9 Effluent Irrigation Line Flushing

1.9.1 Information Requested

Please describe the pipework flushing procedures and maximum holding times (e.g. 48 hrs) proposed to control odour from irrigation of stagnant wastewater. Are the pipes flushed at the end of the processing season?

1.9.2 Comment

Blue Sky does not currently flush the lines and there have not been any recent odour issues related to this (as evidenced by the lack of odour complaints). The lack of current complaints is likely to be the result of the upgraded WWTP significantly improving the quality of the wastewater discharged to land. The upgraded WWTP reduces the organic loading (cBOD₅) in wastewater irrigated to land. High organic loading was the predominant source of odour prior to upgrading. High organic loading is linked to the potential for anaerobic

conditions to develop causing odorous gases to be produced. Blue Sky will double the irrigation buffer zones on the first day of irrigation if there has been no wastewater irrigation for more than 48 hours.

1.10 Boiler Particulate Matter

1.10.1 Information Requested

The measured particulate matter (PM) emission concentrations from the two Vekos boilers are relatively high, even for boilers of this design. The proposed PM emission limit for the RSB corresponds to an emission concentration of 750 mg/Nm³ that would not typically be regarded as meeting the BPO for a coal-fired boiler. Recognising that the HWB will cease operation in 2 years' time, please describe any additional PM control measures proposed to reduce PM emissions from the RSB.

1.10.2 Comment

Modelling

Since the application was lodged, Blue Sky has changed from using lignite to using coal from Bathurst Takitimu mine in an effort to improve the air discharge quality from the boilers. Particulate matter stack testing has been undertaken while using this coal and the emission concentrations have improved as hoped. The lower emissions have been modelled and reported with the flare SO₂ modelling results, which are attached to this letter report.

The maximum cumulative (i.e. including the contribution from background sources) 24-hour average PM₁₀ concentration at the most impacted dwelling for the Hot Water Boiler (HWB) operating at the assumed high TSP discharge concentration (i.e. Scenario 2) using coal, is predicted to be 24.3 µg/m³ or 48.6% of the national ambient air quality standard of 50 µg/m³ including an assumed background concentration. The previous result, for when the boilers were using lignite and discharging at a higher emission rate, was 38.6 µg/m³, or 77.2% of the standard.

Boiler Particulate Controls

Blue Sky has engaged with Windsor Energy – Industrial Boiler Solutions, regarding additional particulate matter control measures that could be applied to the Rendering Steam Boiler (RSB). Their advice is attached as Appendix A. Windsor Energy has advised that to improve emissions further would require the installation of either a baghouse filter or electrostatic precipitator (ESP). The equipment is expected to cost between \$100,000 and \$150,000, plus installation costs of between \$100,000 to \$150,000 with the total expected cost to be \$300,000 ±\$100,000. For a boiler with potentially a relatively limited remaining life burning coal, the improved discharge results from burning a more expensive higher quality coal and the effects of the boiler on the environment, it is considered that this additional expense would achieve limited benefits such that the expense is not warranted.

Given the new source of coal being used in the RSB, Blue Sky proposes to amend the total particulate matter discharge limit proposed in Condition 6(a) of the draft conditions provided in the application from 3.1 kg/hr based on Lignite emissions at a concentration of 500 mg/m³ to 2.3 kg/hr based on Coal emissions at a concentration of 400 mg/m³. Similarly the proposed limit for the HWB in the draft conditions can change from 2.6 kg/hr to 2.3 kg/ based on Coal emissions at a concentration of 1,000 mg/m³.

Operational Controls

In addition to the above, Blue Sky remains committed to

- ceasing use of the HWB and substituting it with an electric hot water system by August 2024 (proposed Condition 13) (noting this will cost \$2.3 million),
- undertaking stack testing on the remaining RSB (proposed in Condition 8) and

- reviewing the opportunities for a low carbon alternative for the RSB such as wood chip/pellet at five yearly intervals (proposed Condition 14).

1.11 Boiler Sulphur Dioxide

1.11.1 Information Requested

Please confirm the calculated SO₂ emission rates for the boilers. Review calculations based on 5% sulphur retention in ash indicate an emission rate of 3.7 g/s for the RSB, whereas the Beca AEE states 2.9 g/s.

1.11.2 Comment

The calculation of the sulphur dioxide emission rate was presented in the AEE in Section 3.2.6 and is reproduced in this section with additional detail.

The emission rates for SO₂ have been calculated using US EPA AP 42 emission factors for lignite coal-fired boilers (Chapter 1 Section 7), based on the maximum permitted sulphur content of the coal in the consent (0.5%) and the maximum coal usage rates as discussed in Section 3.2.6 of the AEE. The SO₂ emission factors for lignite-fired spreader stoker boilers is 30x the sulphur content lb SO₂/ton of lignite burned, or 7.5 kg SO₂/tonne of lignite burned. The SO₂ emission factor assumes that 5% of sulphur present in the lignite is retained in the bottom ash due to alkaline salts being present in the ash and the remaining 95% is discharged to the atmosphere in the form of SO₂ as described in AP-42 Chapter 1.7.

The estimated SO₂ emission rates for both boilers are presented in Table 2.

Table 2. SO₂ estimated emission rates

Emission source	Rendering Steam Boiler	Hot Water Boiler
Coal usage, kg/hr	1,400 (1.4 T/hr)	630 (0.63 T/hr)
Sulphur Content, S%	0.5	0.5
Emission factor, lb SO ₂ /Ton Lignite	30S	30S
Emission factor, kg SO ₂ /T Lignite	7.5	7.5
Emission rate, kg/hr	10.5	4.7
Emission rate, g/s	2.9	1.3

1.12 Modelling of Flare Emissions

1.12.1 Information Requested

It is recommended that SO₂ emissions from the biogas flare be calculated and included in the dispersion modelling. Recent information provided with the SPM Awarua application (and in response to a further information request) indicated significant SO₂ emissions from combustion of such anaerobic pond gases containing H₂S.

1.12.2 Comment

The AERMOD air dispersion model has been run again with the flare emissions included and the results attached to this letter.

From this modelling, the maximum off-site 99.9%ile 1-hour SO₂ concentration for any scenario is predicted to be 85 µg/m³ or 24.3% of the AAQG criteria concentration of 350 µg/m³. The maximum off-site 24-hour average SO₂ concentration at any dwelling is predicted to be 34 µg/m³ or 28.3% of the AAQG criteria concentration of 120 µg/m³.

Yours sincerely



Rhys Kevern

Associate - Air Quality Engineer

on behalf of

Beca Limited

Phone Number: +64 93080878
Email: Rhys.Kevern@beca.com

A

Appendix A – Windsor Engineering Boiler Advice

From: Graham Jolly <graham.jolly@windsor.co.nz>
Sent: Monday, March 13, 2023 2:34 PM
To: Doyle Richardson <doyle.richardson@mitchelldaysh.co.nz>
Subject: RE: Blue Sky Meats Vekos Boiler

Hi Doyle,

Sorry for the delay in responding and unfortunately we're not in a position to help much more than I indicated on the phone. I indicated the cost to supply a baghouse to site would be in the range of \$100,000 - \$200,000. The cost to install and commission the baghouse, including civil works and new ducts is likely to be in the same range.

When combined you could say the mid-point for a baghouse is \$300,000 +/- \$100,000.

Electrostatic Precipitators might be slightly less expensive and not reach the emissions quality of a baghouse.

Multicyclones would offer a slightly lower price again with a further degradation in the emissions reached.

MHM Automation are the Vekos boiler agent in NZ and will have all of the flue gas flows and performance data required to quickly assist you beyond my rough guide today.

Hopefully this is at least helpful in terms of a ballpark figure.

Kind Regards

Check out our new website at www.windsorenergy.co.nz



Level 2, 6 Albion Street
Napier 4110, NZ

www.windsorenergy.co.nz

Graham Jolly BE (Mech)

Sales Team Leader

M: +64 21 543 703

P: +64 6 899 5077

E: graham.jolly@windsor.co.nz



APPENDIX D

Beca updated air quality monitoring

Blue Sky Meats Ltd
729 Woodlands, Morton Mains Road
RD1
Invercargill 9871

29 June 2023

Attention: Steve Paynter

Dear Steve

Modelling of Flare SO₂ and Boiler PM

1 Introduction

Following a review of the air discharge consent application by Environment Southland's external reviewer, an assessment of sulphur dioxide (SO₂) emissions from the wastewater treatments plant's flare was requested. In addition, Blue Sky Meats Ltd (Blue Sky) has sourced a new coal with a higher calorific value for use in the boilers. A higher calorific value coal, compared to the previously used lignite, allows for less fuel to be used to generate the same amount of heat. Blue Sky undertook a stack test when the boilers were burning the new coal to assess any changes in the discharge. The monitoring showed a different distribution of fine particulate matter (PM₁₀ and PM_{2.5}). An assessment of the effect of this change has also been undertaken.

In both cases, further air dispersion modelling has been undertaken, using the same AERMOD model as used in the Beca Air Discharges Technical Report, to provide an assessment of off-site effects on air quality.

2 Model Inputs

2.1.1 Flare SO₂ and mass emission calculations

The designers of the wastewater treatment plant have provided the following information on the flare discharge. The flare operates at 850°C and the likely concentration of hydrogen sulphide (H₂S) is 4,000 ppm v/v. The Engineering ToolBox, (2005). Fuel Gases - Heating Values. [online] states the calorific value to be 23.1 MJ/m³ (at 15°C, 101.325 kPa).

Using this information, the sulphur dioxide (SO₂) mass emission rate was calculated as shown in Table 1. The emission rate assumes all of the sulphur (as hydrogen sulphide) is emitted as SO₂.

Table 1. SO₂ mass emission calculations

Parameter	Value	Unit
Normal gas flow @ 0°C	9000	Nm ³ /day
	0.104	Nm ³ /s
Normal gas flow @ 15°C	0.110	m ³ /s
Calorific value	23.1	MJ/m ³ @ 15°C
Heat output	2.54	MW

Parameter	Value	Unit
Pressure	101.325	kPa
H ₂ S Molecular Weight	34.08	g/mol
Temperature	0	°C
Conversion factor (ideal gas)	1.521	kg/m ³
H ₂ S concentration (in ppm)	4000	ppm
H ₂ S Concentration (in mg/Nm ³)	6082	mg/Nm ³
H ₂ S emission rate	0.63	g/s
Total SO ₂ emission rate	1.19	g/s

2.1.2 Stack height and velocity

Section 10.1 of The British Columbia Air Quality Dispersion Modelling Guideline 2015 provides guidance on modelling flares. It comments:

“The Guideline Refined model AERMOD does not have an explicit treatment of flares. Instead, flares can be modelled as point sources with modified stack parameters (i.e. pseudo-stack parameters) which are selected to ensure the correct plume rise is calculated.”

The physical discharge point is 5.5 m above ground level and has a diameter of 0.05 m. The pseudo stack parameters for this flare are an effective stack height of 8.15 m and an effective stack diameter of 0.53 m. The guidance also recommends using an exit velocity of 20 m/s. These values have been used in the modelling. The full calculation of these factors is provided in Attachment A.

2.1.3 Flare Location

The location of the flare is shown in Figure 1.



Figure 1. Modelled flare location

3 Modelled Emission Scenarios

3.1 Overview

Three emission scenarios were modelled for particulate emissions from the boilers and two for the wastewater plant flare:

- Scenario 1 (Consented Emissions):** Assumes the Rendering Steam Boiler (RSB) and the Hot Water Boiler (HWB) are both in continuous operation at maximum capacity. TSP emissions from the boilers are assumed to be at the current consent limit of 500 mg/dsm³ @ 12% CO₂ and PM₁₀ and PM_{2.5} emission rates have been calculated from the November 2022 total suspended particulate matter (TSP) monitoring results. Sulphur dioxide (SO₂) from the boilers is calculated based on the coal burning rate and a sulphur concentration of 0.5% (current limit).
- Scenario 2 (High Particulate Emissions):** Assumes the RSB and HWB are both in continuous operation at maximum capacity. The TSP emission concentration from the RSB boiler is assumed to be 500 mg/dsm³ @ 12% CO₂ and the HWB is 1,000 mg/dsm³ @ 12% CO₂ which represents the actual maximum emissions from the testing related to the new coal with some buffer allowed. PM₁₀ and PM_{2.5} emission rates have been calculated from the TSP results using the proportions from the November 2022 round of testing. Sulphur dioxide emissions parameters are the same as Scenario 1 so have not been assessed again.
- Scenario 3 (Future Emissions):** Assumes the RSB is in continuous operation at maximum capacity and the HWB has been decommissioned. The TSP concentration from the RSB is assumed to be 500 mg/dsm³ @ 12% CO₂ and PM₁₀ and PM_{2.5} emission rates calculated as above. Sulphur dioxide from the RSB boiler is calculated based on the coal burning rate to produce the required heat and a sulphur concentration of 0.5%.

For all scenarios, the boilers and flare are assumed to operate continuously for 24 hours per day for the simulation period. The model's emissions assumptions are therefore conservative and assume that maximum site emissions occur at the same time as worst-case dispersion conditions. The emission rate calculations are attached to this letter as Attachment B.

A summary of the modelled emission parameters is shown in Table 3.

Table 3 Summary of the modelled emission parameters

Parameter	Unit	Rendering Steam Boiler - coal	Hot Water Boiler - Coal	Flare
Rated Capacity	MW	4.3	1.9	2.54
Coal Usage @ 20.7 MJ/kg both 75% thermal efficiency	kg/hour	1,000	450	-
Stack Height	m	20	18.6	5.5 (8.15 model)
Stack Diameter	mm	705	600	50 (530 model)
Stack Diameter at exit	mm	705	400	50 (530 model)
Exit Temperature	°C	206	167	850
Average Exit Flow Rate, dry standard	m ³ /hour	5,636	2,702	-
	m ³ /s	1.57	0.75	0.104
Average Exit Velocity, actual at test point	m/s	7.9	4.8	-
Exit Velocity, actual at exit	m/s	7.9	10.8	20
TSP Emission Rate	kg/hr	2.9 at 500 mg/m ³	2.34 at 1000 mg/m ³	-
S1 PM ₁₀ Emission Rate	g/s	0.49	0.07	-

Parameter	Unit	Rendering Steam Boiler - coal	Hot Water Boiler - Coal	Flare
S1 PM _{2.5} Emission Rate	g/s	0.40	0.03	-
S2 PM ₁₀ Emission Rate	g/s	0.49	0.14	-
S2 PM _{2.5} Emission Rate	g/s	0.40	0.06	-
S3 PM ₁₀ Emission Rate	g/s	0.49		-
S3 PM _{2.5} Emission Rate	g/s	0.40		-
SO ₂ Emission Rate @ 0.5%S	g/s	2.6	1.2	1.19

3.2 SO₂ Modelling Results

Table 4 summarises the maximum 99.9%ile 1-hour and maximum 24-hour SO₂ off-site concentrations associated with the discharges from the coal fired boilers and the flare, predicted outside the site boundary and at dwellings in the vicinity of the site for Scenarios 1 & 3. Scenario 2 only relates to particulate emissions.

Table 4 Summary of predicted maximum 99.9%ile 1 hour and maximum 24-hour average SO₂ concentrations

Scenario	Operating Schedule	Receptor	Maximum Predicted Off-Site Concentration (µg/m ³)			Total Ambient conc. as % of Air Quality Criteria	Air Quality Criteria (µg/m ³)
			Site Contribution	Background Concentration	Total		
Scenario 1	99.9%ile 1 hr	max dwelling	62	0	62	17.7%	350
		max off-site	85	0	85	24.3%	350
	24 hrs	max dwelling	34	0	34	28.3%	120
		max off-site	50	0	50	41.7%	120
Scenario 3	99.9%ile 1 hr	max dwelling	55	0	55	15.7%	350
		max off-site	85	0	85	24.3%	350
	24 hrs	max dwelling	28	0	28	23.3%	120
		max off-site	50	0	50	41.7%	120

The maximum off-site 99.9%ile 1-hour SO₂ concentration for any scenario is predicted to be 85 µg/m³ or 24.3% of the AAQG criteria concentration of 350 µg/m³. The peak concentration is predicted to occur at the southeast boundary of the site. The modelling results are dominated by the flare emissions as they are discharged at a much lower height than the boiler discharges and therefore the results, with or without the hot water boiler, are very similar near the site but reduce at the nearest dwelling.

The maximum off-site 24-hour average SO₂ concentration at any dwelling is predicted to be 34 µg/m³ or 28.3% of the AAQG criteria concentration of 120 µg/m³. The peak concentration is predicted to occur at the SE neighbour across the road from the site. Once the HWB is decommissioned, the ambient concentrations at a dwelling would reduce to the Scenario 3 levels where the site contribution is predicted to be 28 µg/m³ or 23.3% of the AAQG criteria concentration of 120 µg/m³.

3.3 Predicted Maximum 24-Hour and Annual Average PM₁₀ Concentrations

Table 5 summarises the maximum 24-hour and annual PM₁₀ off-site concentrations associated with the discharges from the coal fired boilers predicted outside the site boundary and at dwellings in the vicinity. As the ambient standards are based on locations where people may be present for the averaging period, the results at dwellings are more relevant in this case as people are not likely to be present at non-residential locations around the site for a 24-hour period.

Table 5 shows the maximum predicted PM₁₀ concentrations for all three scenarios. The predicted concentrations are conservative as they assume peak ambient concentrations occur during worst case dispersion conditions.

Table 5 Summary of predicted maximum 24-hour and annual average PM₁₀ concentrations

Scenario	Operating Schedule	Receptor	Maximum Predicted Off-Site Concentration (µg/m ³)			Total Ambient conc. as % of Air Quality Criteria	Air Quality Criteria (µg/m ³)
			Site Contribution	Background Concentration	Total		
Scenario 1	24 hrs	max dwelling	3.7	19.8	23.5	47.0%	50
		max off-site	5.6	19.8	25.4	50.8%	50
	Annual	max dwelling	0.63	6.1	6.7	33.7%	20
		max off-site	0.77	6.1	6.9	34.4%	20
Scenario 2	24 hrs	max dwelling	4.5	19.8	24.3	48.6%	50
		max off-site	5.8	19.8	25.6	51.2%	50
	Annual	max dwelling	0.75	6.1	6.9	34.3%	20
		max off-site	0.92	6.1	7.0	35.1%	20
Scenario 3	24 hrs	max dwelling	3.2	19.8	23.0	46.0%	50
		max off-site	5.3	19.8	25.1	50.2%	50
	Annual	max dwelling	0.49	6.1	6.6	33.0%	20
		max off-site	0.63	6.1	6.7	33.7%	20

The maximum cumulative (i.e. including the contribution from background sources) 24-hour average PM₁₀ concentration at the most impacted dwelling for the HWB operating at the assumed high TSP discharge concentration (i.e. Scenario 2) using coal, is predicted to be 24.3 µg/m³ or 48.6% of the national ambient air quality standard of 50 µg/m³ including an assumed background concentration. The previous result, for when the boilers were using lignite and discharging at a higher emission rate, was 38.6 µg/m³, or 77.2% of the standard.

Once the HWB is decommissioned, the maximum 24-hour average PM₁₀ concentration at the most impacted dwelling (Scenario 3) is predicted to be 23 µg/m³, or 46.0% of the national ambient air quality standard which is very similar to the result for lignite use. This predicted maximum concentration is similar to the maximum predicted concentration at a dwelling of 23.5 µg/m³ for Scenario 1 (both boilers operating at consent limits). The RSB has a higher proportion of PM₁₀ in the TSP and therefore has a more significant impact on the predicted ambient concentrations. The peak concentration is predicted to occur at the dwelling to the SW of the site across the road (approximately 470 m from the plant).

The maximum annual PM₁₀ concentration contribution at any dwelling occurs for Scenario 2 and is predicted to be 0.75 µg/m³. The maximum cumulative concentration is predicted to be 6.9 µg/m³ or 34.3% of the NESAQ compared to using lignite with a cumulative concentration of 8.9 µg/m³ or 44.5% of the NESAQ criteria concentration of 20 µg/m³ for an assumed background of 6.1 µg/m³. The peak concentration is predicted to occur at the closest dwelling located to the SE of the site. Once the HWB is shutdown, the ambient concentrations would reduce to the Scenario 3 levels of 0.49 µg/m³ or a cumulative 33.0% of the NESAQ criteria which is less than the Scenario 1 concentration.

3.4 Predicted Maximum 24-Hour and Annual Average PM_{2.5} Concentrations

Table 6 summarises the maximum 24-hour and annual off-site PM_{2.5} concentrations associated with the discharges from the boilers. The table shows the maximum predicted offsite PM_{2.5} concentrations for the three scenarios.

The predicted concentrations are conservative as they assume peak emission conditions occur during worst case dispersion conditions.

Table 6 Summary of predicted maximum 24-hour and Annual average PM_{2.5} concentrations

Scenario	Operating Schedule	Receptor	Maximum Predicted Off-Site Concentration (µg/m ³)			Total Ambient conc. as % of Draft NESAQ	Draft NESAQ (µg/m ³)
			Site Contribution	Background Concentration	Total		
Scenario 1	24 hrs	max dwelling	2.8	13	15.8	63.2%	25
		max off-site	4.5	13	17.5	70.0%	25
	Annual	max dwelling	0.46	4	4.5	44.6%	10
		max off-site	0.57	4	4.6	45.7%	10
Scenario 2	24 hrs	max dwelling	3.0	13	16.0	64.0%	25
		max off-site	4.5	13	17.5	70.0%	25
	Annual	max dwelling	0.51	4	4.5	45.1%	10
		max off-site	0.63	4	4.6	46.3%	10
Scenario 3	24 hrs	max dwelling	2.6	13	15.6	62.4%	25
		max off-site	4.4	13	17.4	69.6%	25
	Annual	max dwelling	0.40	4	4.4	44.0%	10
		max off-site	0.51	4	4.5	45.1%	10

The maximum cumulative 24-hour average PM_{2.5} concentration at the most impacted dwelling for the HWB operating at the assumed high TSP discharge concentration (i.e. Scenario 2) is predicted to be 16.0 µg/m³, or 64% of the proposed national ambient air quality standard of 25 µg/m³ including an assumed background concentration. This result is similar to the previous modelling predictions of 16.3 µg/m³, or 65.2% of the proposed national ambient air quality standard of 25 µg/m³ for use of lignite at higher particulate emission rates.

Once the HWB is decommissioned, the maximum 24-hour average PM_{2.5} concentration at the most impacted dwelling (Scenario 3) is predicted to be 15.6 µg/m³, or 62.4% of the proposed national ambient air quality standard. This compares to the previous modelling predictions for use of lignite of 14.0 µg/m³, or 56.0% of the proposed national ambient air quality standard. This predicted maximum concentration is similar to the maximum predicted concentration of 15.8 µg/m³ for Scenario 1 (both boilers operating at consent limits). As discussed above, the proportion of TSP that is PM_{2.5} is much greater in the RSB emissions compared to the HWB which means that the RSB emissions dominate the modelling predictions which explains the similar result for Scenarios 1 and 3.

4 Summary

Modelled predictions of sulphur dioxide have increased due to the inclusion of the wastewater plant flare discharges, but still remain compliant with the ambient air criteria.

Modelled predictions of PM₁₀ ambient concentrations during coal use have reduced from the predictions for lignite use mainly due to the lower TSP results modelled in Scenarios 2 and 3. The lower TSP emission rate is offset by a higher proportion of PM₁₀ and PM_{2.5} in the RSB emission so the net change is quite small.

The PM_{2.5} concentration estimates have increased a little for coal use due to there being a higher proportion of PM_{2.5} in the TSP monitored during coal usage. Both PM₁₀ and PM_{2.5} emissions comply with the ambient air criteria.

Yours sincerely

A handwritten signature in black ink that reads "Rhys Kevern". The signature is written in a cursive style with a large initial 'R'.

Rhys Kevern

Associate - Air Quality Engineer

on behalf of

Beca Limited

Phone Number: +64 93080878
Email: Rhys.Kevern@beca.com



21 Pitt Street,
PO Box 6345, Auckland,
1141, New Zealand

T: +64 9 300 9000 // F: +64 9 300 9300

E: info@beca.com // www.beca.com

Attachment A: Flare Pseudo parameters

$$\diamond H_e = H_s + (4.56 * 10^{-3}) * Q^{0.478}$$

$$\diamond D_e = 0.0122 \sqrt{\frac{T_s * Q * (1-F)}{g * (T_s - T_a) * V_s}}$$

British Columbia modelling guidance for flares.

		Flare	
Physical Stack Height, H _s	m	5.5	
Total heat release, Q	MW	2.54	
Total heat release, Q	cal/s	606668.6	
Effective Stack Height, H_e	m	8.15	
Effective Stack Exit Temp, T _s	°C	850.00	
Effective Stack Exit Temp, T _s	K	1123.15	<i>BC AQ Modelling Guidelines Recommended Value 1273K</i>
Ambient Temperature, T _a	°C	20	
Ambient Temperature, T _a	K	293.15	<i>BC AQ Modelling Guidelines Recommended Value</i>
Radiative Heat Loss Fraction, F	%	0.55	<i>BC AQ Modelling Guidelines Recommended Value</i>
Acceleration due to Gravity, g	m/s ²	9.81	<i>Constant</i>
Effective Stack Velocity, V _s	m/s	20	<i>BC AQ Modelling Guidelines Recommended Value</i>
Effective Stack Diameter, D_e	m	0.53	

**make
everyday
better.**

Attachment B: Boiler emission calculations from stack testing results

RSB					New Coal			New Coal
Parameter	12-Sep-19	13-Oct-20	22-Jan-21	26-May-22	22-Nov-22	Jan-21	May-22	Nov-22
Actual TSP Concentration, mg/dsm ³	760	460	476	627	260			
TSP Concentration, mg/dsm ³ @ 12% CO ₂	783	480	607	607	253			
TSP emission rate, g/s	1.36	0.83	0.86	1.11	0.41			
Particulate matter emission rate @ 500 mg/m ³ 12% CO ₂ , g/s	0.87	0.86	0.71	0.91	0.80			
Particulate matter emission rate @ 750 mg/m ³ 12% CO ₂ , g/s	1.30	1.30	1.06	1.37	1.20			
Particulate matter emission rate @ 1,000 mg/m ³ 12% CO ₂ , g/s	1.74	1.73	1.42	1.83	1.60			
PM ₁₀ emission rate, g/s	0.83*	0.51*	0.53	0.4	0.24	61%	36%	61%
PM ₁₀ emission rate @ 500 mg/m ³ 12% CO ₂ , g/s	0.53	0.53	0.43	0.33	0.49			
PM ₁₀ emission rate @ 750 mg/m ³ 12% CO ₂ , g/s	0.79	0.79	0.65	0.49	0.73			
PM ₁₀ emission rate @ 1,000 mg/m ³ 12% CO ₂ , g/s	1.06	1.05	0.86	0.66	0.98			
PM _{2.5} emission rate, g/s	0.16*	0.10*	0.11	0.05	0.20	12%	5%	50%
PM _{2.5} emission rate @ 500 mg/m ³ 12% CO ₂ , g/s	0.10	0.10	0.09	0.05	0.40			
PM _{2.5} emission rate @ 750 mg/m ³ 12% CO ₂ , g/s	0.16	0.16	0.13	0.07	0.60			
PM _{2.5} emission rate @ 1,000 mg/m ³ 12% CO ₂ , g/s	0.21	0.21	0.17	0.09	0.80			

HWB					New Coal			
Parameter		13-Oct-20	22-Jan-21	26-May-22	22-Nov-22			
Actual TSP Concentration, mg/dsm ³		360	719	1950	750			
TSP Concentration, mg/dsm ³ @ 12% CO ₂		427	736	1707	867			
TSP emission rate, g/s		0.56	1.05	1.35	0.57			
Particulate matter emission rate @ 500 mg/m ³ 12% CO ₂ , g/s		0.66	0.71	0.40	0.33			
Particulate matter emission rate @ 750 mg/m ³ 12% CO ₂ , g/s		0.98	1.07	0.59	0.49			
Particulate matter emission rate @ 1,000 mg/m ³ 12% CO ₂ , g/s		1.31	1.43	0.79	0.65			
PM ₁₀ emission rate, g/s		0.31*	0.58	0.36	0.13	55%	27%	22%
PM ₁₀ emission rate @ 500 mg/m ³ 12% CO ₂ , g/s		0.36	0.39	0.11	0.07			
PM ₁₀ emission rate @ 750 mg/m ³ 12% CO ₂ , g/s		0.54	0.59	0.16	0.11			
PM ₁₀ emission rate @ 1,000 mg/m ³ 12% CO ₂ , g/s		0.72	0.78	0.21	0.14			
PM ₁₀ emission rate @ 2,000 mg/m ³ 12% CO ₂ , g/s		1.44	1.57	0.43	0.29			
PM _{2.5} emission rate, g/s		0.05*	0.08	0.04 (3% TSP)	0.05	9%	3%	9%
PM _{2.5} emission rate @ 500 mg/m ³ 12% CO ₂ , g/s		0.06	0.06	0.01	0.03			
PM _{2.5} emission rate @ 750 mg/m ³ 12% CO ₂ , g/s		0.09	0.10	0.02	0.04			
PM _{2.5} emission rate @ 1,000 mg/m ³ 12% CO ₂ , g/s		0.12	0.13	0.02	0.06			
PM _{2.5} emission rate @ 2,000 mg/m ³ 12% CO ₂ , g/s		0.24	0.26	0.05	0.12			



APPENDIX E

Updated proposed consent conditions

PROPOSED CONSENT CONDITIONS 18TH AUGUST 2023

Deletions from the previous version are shown in ~~red strikethrough~~ and additions in red underline.

Proposed Conditions: Discharge of contaminants to air	
1	<p>This resource consent authorises the discharge of contaminants to air from the applicant's industrial premises at Morton Mains from the following sources, as described in the application dated June 2022, subject to the conditions set out in this consent:</p> <ul style="list-style-type: none"> a. a rendering plant processing up to 5,750 kg of raw material per hour; b. a blood processing and drying operation; c. a meat processing plant; d. collection and treatment of wastewater from rendering, meat processing and site wide washing processes; e. irrigation of treated wastewater onto land; f. one 4.3 MW coal-fired boiler (rendering steam boiler); g. one 1.9 MW coal-fired boiler (hot water boiler); and h. salting shed.
Boilers	
2	<ul style="list-style-type: none"> a. The maximum coal burning rate in the rendering steam boiler shall not exceed 1,400 kilograms of coal per hour; and b. The maximum coal burning rate in the hot water boiler shall not exceed 630 kilograms of coal per hour.
3	<p>The opacity of emissions from the chimney stacks of the boilers shall not be darker than Ringelmann Shade 1 as described in New Zealand Standard 5201:1973 except:</p> <ul style="list-style-type: none"> a. in the case of a cold start, for a period not exceeding 30 minutes in the first hour of operation; and b. for a period not exceeding a total of four minutes in each succeeding hour of operation.
4	<ul style="list-style-type: none"> a. The discharge into air from the rendering steam boiler shall occur via a stack at a height of at least 20 metres above ground level and at least 9 metres above the roof ridgeline of any adjacent building; and

Proposed Conditions: Discharge of contaminants to air

	<p>b. the discharge into air from the hot water boiler shall occur via a stack at a height of at least 18.6 metres above ground level and at least 9.6 metres above the roof ridgeline of any adjacent building.</p> <p>c. the discharges from the boilers shall be directed vertically into air and shall not be impeded by any obstruction above the stack which decreases the vertical efflux velocity.</p>
5	The sulphur content of a representative sample of the coal burned in the boilers shall not exceed 0.5 percent by weight. The ash content of that sample shall be less than 7 percent by weight. The sample shall contain less than 30 percent by weight of fine particles having a diameter of less than 3.35 millimetres.
6	<p>a. The mass emission of total particulate matter discharged from the rendering steam boiler shall not exceed 2.30 kg/hr 3.10 kg/hr; and</p> <p>b. the mass emission of total particulate matter discharged from the hot water boiler shall not exceed 2.30 kg/hr 2.60 kg/hr;</p>
7	The boiler stacks shall be fitted with source emission test ports and safe access for testing, to the satisfaction of the Environment Southland Compliance Manager.
8	<p>a. The rendering steam boiler identified in Condition 1(f) shall be tested annually to confirm compliance with Condition 6(a) prior to the first, second and third anniversaries of the date of the commencement of this consent.</p> <p>b. Testing of the rendering steam boiler can reduce to once every three years if compliance with Condition 6(a) has always been achieved during the testing undertaken in accordance with Condition 8(a).</p> <p>c. If compliance with Condition 6(a) has not always been achieved during testing undertaken under Condition 8(a) then annual testing shall be undertaken until compliance with Condition 6(a) over three consecutive years of monitoring has been achieved.</p>
9	The hot water boiler identified in Condition 1(g) shall be tested annually to confirm compliance with Condition 6(b) prior to the first and second anniversaries of the commencement of this consent.
10	Testing to confirm compliance with the particulate mass emission limit shall occur when the tested boiler is operating at greater than 75 percent of the boiler heat output stated in Condition 1(f) for the rendering steam boiler and Condition 1(g) for the hot water boiler. The method of sampling and analysis shall be to stack testing industry standards such as USEPA, ASTM or ISO testing methods. All analyses shall be performed by an International Accreditation New

Commented [DR1]: Reduced emission limit to reflect better quality coal now being used in the boiler.

Commented [DR2]: Reduced emission limit to reflect better quality coal now being used in the boiler.

Proposed Conditions: Discharge of contaminants to air

	Zealand (IANZ) registered laboratory or otherwise as specifically approved by the Environment Southland Compliance Manager.
11	Results of testing undertaken by Condition 8 and 9 shall be forwarded to the Environment Southland Compliance Manager within 30 working days of the results being made available to the Consent Holder.
12	The boilers shall be serviced and maintained to ensure compliance with Conditions 3 and 6 at all times. Service reports shall be prepared and retained for at least 7 years, and copies shall be provided to the Environment Southland Compliance Manager on request.
13	The Consent Holder shall cease using the hot water boiler identified in Condition 1(g) after August 2024.
14	At five yearly intervals, following the commencement of this consent, the Consent Holder shall conduct a review of low carbon alternatives for the rendering steam boiler identified in 1(f). The review shall detail: a. any changes in central or local government policies or rules regarding the burning of coal in that boiler; b. the availability of alternative fuel sources that provide the necessary energy output requirements; c. the availability of new technologies which could be used in place of the rendering steam boiler and the feasibility of those; and d. the financial implications and energy capacity of alternative fuel sources or technologies identified in Conditions 14(b) and 14(c).
15	A report detailing the findings of Condition 14 shall be provided to the Environment Southland Compliance Manager within 30 working days of the review being undertaken.

Rendering and meat processing

16	The Consent Holder shall ensure that only fresh or suitably preserved raw material is processed in the rendering plant. Unpreserved raw material for rendering shall not be held on-site for more than 24 hours. Suitably preserved material shall be material that is chilled or frozen and is derived from cutting, boning or further processing of animal tissue that has been chilled or frozen within 24 hours of the time of slaughter.
----	---

Proposed Conditions: Discharge of contaminants to air

17	<p>The Consent Holder shall ensure that the ventilation system draws adequate negative pressure to ensure the effective capture of contaminants from the rendering plant building and all other areas from which air is extracted to minimise fugitive emissions. The ventilation air shall be discharged via the rendering plant biofilter, as described in Condition 18.</p> <p>The Consent Holder shall undertake an inspection of the ventilation and pre-treatment (condensers etc) equipment every 5 years from the commencement of this consent. A record of these inspections must be retained and be available to the Environment Southland Compliance Manager on request.</p>
18	<p>The rendering plant biofilter shall be capable of treating all an air volume of at least 12 air changes per hour of from the rendering building and the air volume from point sources within the rendering plant. The biofilter shall contain filter media to a depth of at least 1 metre over an area of at least 1024 m².</p>
19	<p>The Consent Holder shall measure and record the following biofilter parameters:</p> <ol style="list-style-type: none"> the air pressure of the biofilter inlet duct compared to atmospheric pressure by pressure gauge or U-tube manometer and the pH and moisture content of the biofilter media via a handheld soil tester on a monthly basis; odour characteristic of the air discharged from the biofilter on the downwind edge of the biofilter on a weekly basis; the temperature of the air entering the biofilter on a continuous basis; and observations of the air distribution through the biofilter media on a yearly basis to assess whether it is evenly distributed; and <u>air pressure within the following point source extraction ducts on a quarterly basis:</u> <ol style="list-style-type: none"> <u>the two solids' presses;</u> <u>the continuous cooker; and</u> <u>the blood dryer.</u>
20	<p>The biofilter shall be operated in accordance with the following triggers:</p> <ol style="list-style-type: none"> the pressure drop measured at the biofilter inlet duct should not exceed 150 millimetres water gauge or 1.5 kilopascals; the moisture content of the biofilter media should be maintained between 40% and 60% on a wet weight basis; the target pH for the biofilter media is pH 6 to pH 8; and the maximum inlet air temperature shall be 40 degrees Celsius; and

Commented [DR3]: Amended to reflect modifications to the air extraction system.

Proposed Conditions: Discharge of contaminants to air

	<p>e. <u>negative air pressure shall be maintained within the following point source extraction ducts:</u></p> <ul style="list-style-type: none">i. <u>the two solids' presses;</u>ii. <u>the continuous cooker; and</u>iii. <u>the blood dryer.</u>
21	<p>The Consent Holder shall maintain at least 12 months of records of all measurements undertaken in accordance with Condition 19. This record shall be provided to an Environment Southland Compliance Manager on request.</p>
22	<p>Processing areas, collection sumps and traps in the meat processing plant and rendering plant shall be cleaned at least daily to minimise odour emissions.</p>

Wastewater treatment and irrigation

23	<p>The Consent Holder shall ensure that biogases generated from the Wastewater Treatment Plant (WWTP) anaerobic pond are combusted via a flare or an energy recovery system at all times except under the following circumstances:</p> <ul style="list-style-type: none">a. in the event of a combustion equipment failure; orb. for combustion equipment maintenance purposes; orc. for periodic venting of biogases via the flare blower as part of the routine maintenance programme; ord. for the purposes of providing a small continuous supply of biogas from the covered anaerobic treatment facility to the WWTP biofilter to maintain the active bacteria population in the WWTP biofilter.
24	<p>Under the circumstances where biogases are not flared and/or utilised for energy recovery as described in Condition 22, then biogases shall be vented to the WWTP biofilter. If use of the WWTP biofilter is required for more than 20 days in any calendar year ending 31 December, the Consent Holder shall within 60 days of the end of the year provide the Environment Southland Compliance Manager with a report which details the reason for the use of the WWTP biofilter for treating biogas in excess of 20 days during the year.</p>
25	<p>The Consent Holder shall maintain treated wastewater in an aerobic condition using aerators to minimise odour in the irrigation lagoon. If irrigation of treated wastewater does not occur for than more than two days, the irrigation lagoon shall be aerated to avoid the onset of anaerobic conditions.</p>

Proposed Conditions: Discharge of contaminants to air

- | | |
|----|---|
| 26 | <p>a. Wastewater shall not be irrigated onto land within 20 metres of any property boundary. There shall be no spray drift of wastewater beyond that property boundary.</p> <p>b. <u>If treated wastewater irrigation has not occurred for more than 48 hours, wastewater shall not be irrigated onto land within 40 metres of any property boundary on the first day that wastewater irrigation resumes.</u></p> |
|----|---|

Odour

- | | |
|----|--|
| 27 | <p>The air discharges from the Consent Holder's processes shall not cause odour that is offensive or objectionable to such an extent that it has an adverse effect on the environment beyond the boundary of the property on which the consent is exercised.</p> |
|----|--|

Complaints

- | | |
|----|--|
| 28 | <p>The Consent Holder shall maintain a 24 hour contact number for the receipt of complaints and concerns from the public. This contact number shall be listed on the Consent Holder's website (https://bluesky.co.nz).</p> |
|----|--|

- | | |
|----|--|
| 29 | <p>The Consent Holder shall maintain a diary of odour and spray drift complaints.</p> <p>The diary shall record:</p> <ul style="list-style-type: none">a. the effect observed by the complainant;b. the date and time the effect was detected, or the complaint was made;c. the location where the effect was detected by the complainant;d. weather conditions (such as wind direction, approximate wind speed, temperature) when the effect was detected by the complainant;e. nature and intensity of the odour or spray drift;f. the most likely cause of the effect detected; andg. the action taken by the Consent Holder in response to the complaint. <p><i>Advice Note: This condition does not require the Consent Holder to take action over every complaint, but it does require that that decision is recorded.</i></p> |
|----|--|

- | | |
|----|--|
| 30 | <p>The complaint record required by Condition 29 shall be provided to the Environment Southland Compliance Manager annually by 31 July and otherwise on request.</p> |
|----|--|

Air Discharge Management Plan

31	<p>No later than three months from this consent commencing the Consent Holder shall prepare and submit to the Environment Southland Compliance Manager an Air Discharge Management Plan for certification that it is in accordance with this condition.</p> <p>The objective of the Air Discharge Management Plan shall be to detail all actions to be taken to minimise odour and particulate matter emissions from the plant and to ensure compliance with the conditions of this consent.</p> <p>The Air Discharge Management Plan shall include:</p> <ul style="list-style-type: none">a. a description of the contents and purpose of the Air Discharge Management Plan in accordance with this condition;b. a summary of the plant purpose, location, layout, and production equipment with specific reference to contaminant discharge, extraction and treatment equipment, discharge stacks and processes;c. responsibilities and contact details of key personnel;d. operation, inspection and maintenance of the rendering plant equipment, boilers, WWTP (including wastewater irrigation procedures and set back distances) and the biofilters including the extraction and treatment equipment;e. procedures adopted to ensure that the odour extraction equipment in the rendering plant is fully functional before operations commence;f. procedures adopted to ensure that the plant complies with the conditions of this consent at all times;g. measures to be implemented in the event that the trigger levels in Condition 20 are not met;h. details of how emissions will be contained within the rendering building to minimise the potential for fugitive emissions.
32	<p>The Consent Holder shall undertake all onsite activities in accordance with the Air Discharge Management Plan, and all other conditions of this consent. In the event of any inconsistencies between the conditions of consent and the provisions of the Air Discharge Management Plan, the conditions of this consent shall apply.</p>
33	<p>The Air Discharge Management shall be reviewed by the Consent Holder every three years. The purpose of this review shall be to confirm that the Air Discharge Management Plan accurately reflects current on-site activities and operations and to identify if changes to procedures contained within the Air</p>

Proposed Conditions: Discharge of contaminants to air

Discharge Management Plan are required to achieve the objective of this condition. A written report detailing the results of the review shall be submitted to the Environment Southland Compliance Manager within 30 working days of the review being undertaken. If the review results in amendments to the Air Discharge Management Plan, the amended sections shall be provided to the Environment Southland Compliance Manager for certification at this time.

Proposed Conditions: Abstraction and use of groundwater

1	<p>This permit authorises the abstraction of water from up to three bores. These bores are:</p> <ul style="list-style-type: none">a. F46/0517;b. F46/0561; andc. F46/1128.
2	<p>The combined rate of abstraction from the three bores identified in Condition 1 shall not exceed:</p> <ul style="list-style-type: none">a. 1,500,000 litres cubic metres per day; andb. 7,000,000 litres cubic metres per week, and;c. 365,000 cubic metres per year.
3	<p>The Consent Holder shall install a backflow prevention device on the bores identified in Condition 1 or take other appropriate measures to ensure water and/or contaminants cannot return to the water source.</p>
4	<p>The bores identified in Condition 1 are to be maintained so that:</p> <ul style="list-style-type: none">a. there is a seal, made of concrete or similar material, placed at ground level around the outside of the casing. The seal will be sufficient to prevent foreign material, surface water, spillage or other leakage entering the space between the casing and the wall of the borehole;b. the top of the casing is sealed to prevent the entry of contaminants into the casing; andc. fencing is installed to prevent stock accessing the bores.

Monitoring and reporting

5	<p>The Consent Holder shall:</p> <ul style="list-style-type: none">a. provide and maintain access to the heads of each bore to enable measurement of water level in each bore;b. monitor groundwater levels at each bore once each calendar month; andc. when monitoring groundwater levels, record whether or not the bore has been in use during the previous 24 hours and, if it has, the rate of abstraction from the bore during the previous 24 hour period.
---	--

Proposed Conditions: Abstraction and use of groundwater

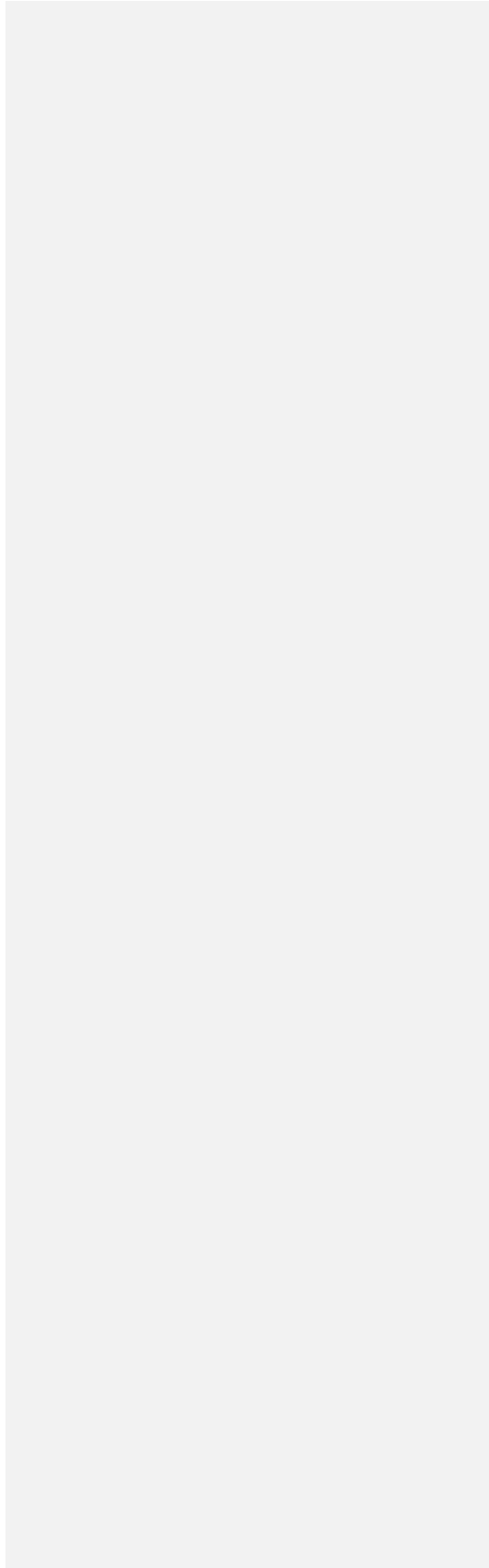
6	<p>A system must measure on a continuous basis the volume taken via the bores identified in Condition 1. The system must have a reliable calibration and must be maintained to an accuracy of +/- 5 percent.</p>
7	<p>Within six months of the commencement of this consent the Consent Holder must provide the Environment Southland Compliance Manager:</p> <ul style="list-style-type: none">a. a copy of any relevant manufacturer calibration certificate; orb. evidence from a suitably qualified person showing that the system required by Condition 6 is verified as accurate to +/- 5 percent.
8	<p>The consent holder must engage a suitably qualified person to undertake additional verification of the accuracy of the system required by Condition 6:</p> <ul style="list-style-type: none">a. at a frequency of no less than five yearly from the date of the first verification required by Condition 7; andb. to the satisfaction of the Environment Southland Compliance Manager. <p>Evidence documenting each additional verification must be forwarded to the Environment Southland Compliance Manager within 30 working days of the verification being completed.</p>
9	<p>The Consent Holder must measure and record the volume of water taken on a cubic metre basis to confirm compliance with Condition 2.</p> <p>When no groundwater is being taken the data must specify the take volume as zero.</p>
10	<p>The Consent Holder must submit a report in electronic spreadsheet format to the Environment Southland Compliance Manager by 1 August each year that contains daily, and weekly and annual volumes of groundwater values for the immediately preceding year ending 30 June – of the volume of groundwater taken pursuant to this consent.</p>

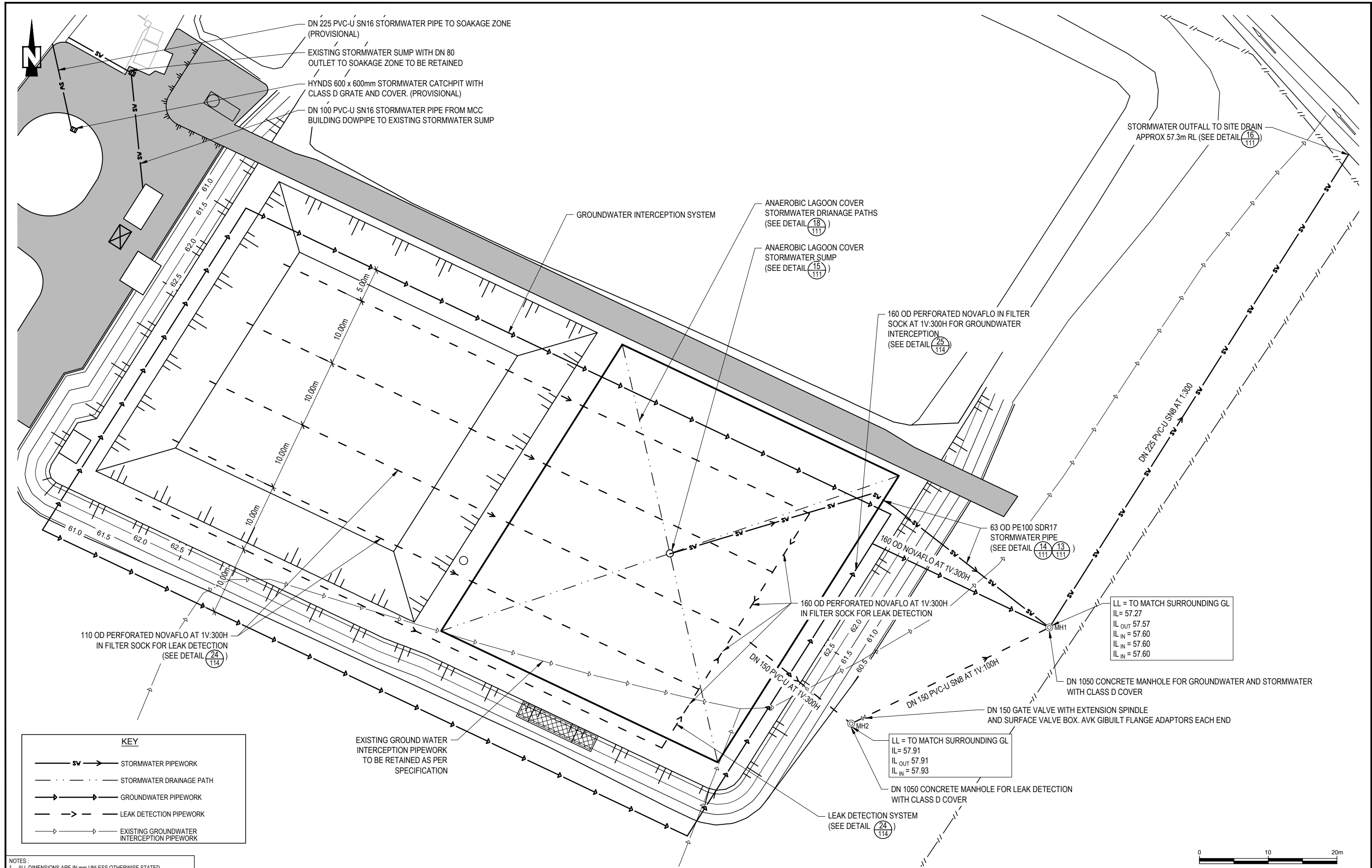
Proposed Conditions: Take groundwater for dewatering

1	The permit authorises the passive taking of groundwater for dewatering the ground beneath the wastewater treatment plant via the subsoil drainage system shown in Attachment 1 - (A03220201 – Drawing No. 007) located at 729 Woodlands Morton Mains Road (1,265,070E 4,857,630 N).
---	---

Attachment 1

A03220201 – Drawing No. 007





DN 225 PVC-U SN16 STORMWATER PIPE TO SOAKAGE ZONE (PROVISIONAL)
 EXISTING STORMWATER SUMP WITH DN 80 OUTLET TO SOAKAGE ZONE TO BE RETAINED
 HYNDS 600 x 600mm STORMWATER CATCHPIT WITH CLASS D GRATE AND COVER. (PROVISIONAL)
 DN 100 PVC-U SN16 STORMWATER PIPE FROM MCC BUILDING DOWPIPE TO EXISTING STORMWATER SUMP

STORMWATER OUTFALL TO SITE DRAIN APPROX 57.3m RL (SEE DETAIL 16/111)

GROUNDWATER INTERCEPTION SYSTEM

ANAEROBIC LAGOON COVER STORMWATER DRAINAGE PATHS (SEE DETAIL 18/111)

ANAEROBIC LAGOON COVER STORMWATER SUMP (SEE DETAIL 15/111)

160 OD PERFORATED NOVAFLO IN FILTER SOCK AT 1V:300H FOR GROUNDWATER INTERCEPTION (SEE DETAIL 25/114)

63 OD PE100 SDR17 STORMWATER PIPE (SEE DETAIL 14/111 13/111)

160 OD PERFORATED NOVAFLO AT 1V:300H IN FILTER SOCK FOR LEAK DETECTION

LL = TO MATCH SURROUNDING GL
 IL = 57.27
 IL_{OUT} = 57.57
 IL_{IN} = 57.60
 IL_{IN} = 57.60

DN 1050 CONCRETE MANHOLE FOR GROUNDWATER AND STORMWATER WITH CLASS D COVER

DN 150 GATE VALVE WITH EXTENSION SPINDLE AND SURFACE VALVE BOX. AVK GIBUILT FLANGE ADAPTORS EACH END

LL = TO MATCH SURROUNDING GL
 IL = 57.91
 IL_{OUT} = 57.91
 IL_{IN} = 57.93

DN 1050 CONCRETE MANHOLE FOR LEAK DETECTION WITH CLASS D COVER

LEAK DETECTION SYSTEM (SEE DETAIL 24/114)

0 10 20m
 SCALE 1:500 (A3)

KEY

	STORMWATER PIPEWORK
	STORMWATER DRAINAGE PATH
	GROUNDWATER PIPEWORK
	LEAK DETECTION PIPEWORK
	EXISTING GROUNDWATER INTERCEPTION PIPEWORK

NOTES:
 1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
 2. SEE TO DWG 003 AND 004 FOR SETTING OUT DETAILS.
 3. THE IDENTITY AND LOCATION OF ANY SERVICES SHOWN ON THIS DRAWING CANNOT BE GUARANTEED TO BE COMPLETE OR ACCURATE.
 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL SERVICES PRIOR TO UNDERTAKING ANY EXCAVATION.

SOURCE:
 1. SURVEY DATA SUPPLIED BY BONISCH CONSULTANTS LTD. 181102 6700 Rev.B. SURVEYED ON 08/08/2018 AND 26/10/2018
 2. AERIAL IMAGERY (FLOWN 01/13/2016) DERIVED FROM GOOGLE EARTH PRO (MAY NOT BE SPATIALLY ACCURATE)

NO.	REVISION	DATE	APP.
0	FOR TENDER	DEC 18	
A	FOR REVIEW	NOV 18	

DESIGNED	BY	CHECKED	DATE
	A.D.	D.G.	OCT 18
DRAWN	BY	CHECKED	DATE
	D.F.P.	D.R.	OCT 18
APPROVED ISSUE FOR :	TENDER DEC 18		
APPROVED :			
THIS DRAWING IS NOT FOR CONSTRUCTION UNLESS SIGNED AS APPROVED			
COPYRIGHT ON THIS DRAWING IS RESERVED			

CLIENT: **BlueSkyMeats**

PROJECT:	NEW WASTEWATER TREATMENT PLANT		
TITLE:	STORMWATER AND GROUNDWATER LAYOUT		
PROJECT NO.:	A03220201	SCALE 1:500 (A3)	SHEET OF: 007 0
DRAWING NO.:	007	REV:	0

pdp solutions for your environment
PATTE DELAMORE PARTNERS LTD
 Level 4, PDP House, 235 Broadway, Newmarket, Auckland
 P.O. Box 9628, Auckland 1149, New Zealand.
 Telephone: (09) 523 6900
 Auckland Tauranga Wellington Christchurch

FILED: A03220201D002.dwg

Proposed Conditions: Discharge of land drainage water and stormwater to water

1 This consent authorises the discharge of land drainage water taken in accordance with Consent [reference take of groundwater for dewatering consent], and the discharge of stormwater from the covered anaerobic lagoon wastewater treatment plant to water in an open drain at the location shown in Attachment 1 - (A03220201 Drawing 007 Rev 0), as described in the application dated June 2022.

Monitoring and reporting

2

a. The Consent Holder shall sample the land drainage water prior to the discharge point within three months one-year of the commencement of this consent and quarterly annually thereafter and have it analysed for the following:

- i. biochemical oxygen demand
- ii. total ammonia nitrogen
- iii. total nitrate nitrogen
- iv. total nitrite nitrogen
- v. total nitrogen
- vi. E. coli

b. the Consent Holder shall also sample water from the open drain between 5 and at a minimum 20 metres upstream of the discharge point, and have the samples analysed for the same parameters as are listed in Condition 2(a);

c. sampling in accordance with Condition 2(b) shall occur within 2 hours of samples taken in accordance with Condition 2(a);

d. Stormwater discharged from the Covered Anaerobic Lagoon shall be sampled annually following a rain event that exceeds 10 mm/day, and analysed for:

- i. 5-day carbonaceous biochemical oxygen demand;
- ii. Total Kjeldahl nitrogen;
- iii. Total phosphorus; and
- iv. E. coli.

If stormwater is not being discharged under this consent, then this sampling is not required.

e. sample collection, preservation and analysis shall be carried out in accordance with the most recent edition of APHA "Standard Methods for the Examination of Water and Wastewater"; and

f. the monitoring and analyses are to be carried out by a laboratory with IANZ registration or equivalent, or as agreed to in writing with the Environment Southland Compliance Manager.

Proposed Conditions: Discharge of land drainage water and stormwater to water

- 3
- a. The Consent Holder shall report to the results of monitoring required by Condition 2 in writing to the Environment Southland Compliance Manager (email: escompliance@es.govt.nz) within 30 working days of receipt of the sample results.
 - ~~b. The report shall include the sample locations, comparison of the land drainage water and the water in the open drain, and comment whether the parameters sampled in Condition 2(a) indicate any contamination of the land drainage water by wastewater.~~
 - b. If the concentration of contaminants in a sample of land drainage water collected in accordance with Condition 2(a) exceeds:
 - i. a total ammonia concentration of 1 gram per cubic metre; and/or
 - ii. a 5-day biological oxygen demand concentration of 2 grams per cubic metre;

then the consent holder shall include in the written report required by Condition 3(a), the cause of the exceedance and if necessary, identify a preferred mitigation option for addressing the cause of the exceedance.
 - c. If the concentration of contaminants in a sample of stormwater collected in accordance with Condition 2(d) exceeds:
 - i. a total nitrogen concentration of 5 grams per cubic metre; and/or
 - ii. a 5-day biological oxygen demand concentration of 2 grams per cubic metre;

then the consent holder shall include in the written report required by Condition 3(a), the cause of the exceedance and if necessary, identify a preferred mitigation option for addressing the cause of the exceedance.
 - ~~b. If the total ammonia nitrogen exceeds a concentration of 1 gram per cubic metre and/or the biochemical oxygen demand exceeds a concentration of 2 grams per cubic metre in the sample collected in accordance with Condition 2(a), the Consent Holder shall prepare a report identifying the cause of the exceedance and if needed, identify a preferred mitigation option for addressing the cause of the exceedance.~~
 - d. The Consent Holder shall implement the preferred mitigation option identified in the report prepared in accordance with Condition ~~3(c)~~ 3(a) as soon as practicable.
 - e. A copy of the report prepared in accordance with Condition ~~3(c)~~ 3(a) shall be provided to the Environment Southland Compliance Manager within 10 working days of the report being completed.

Commented [DR4]: Condition 3(b) has been removed because it achieves the same outcome as condition 3c (now 3(b)). Sample locations are specified in Condition 2(a) and 2(b).

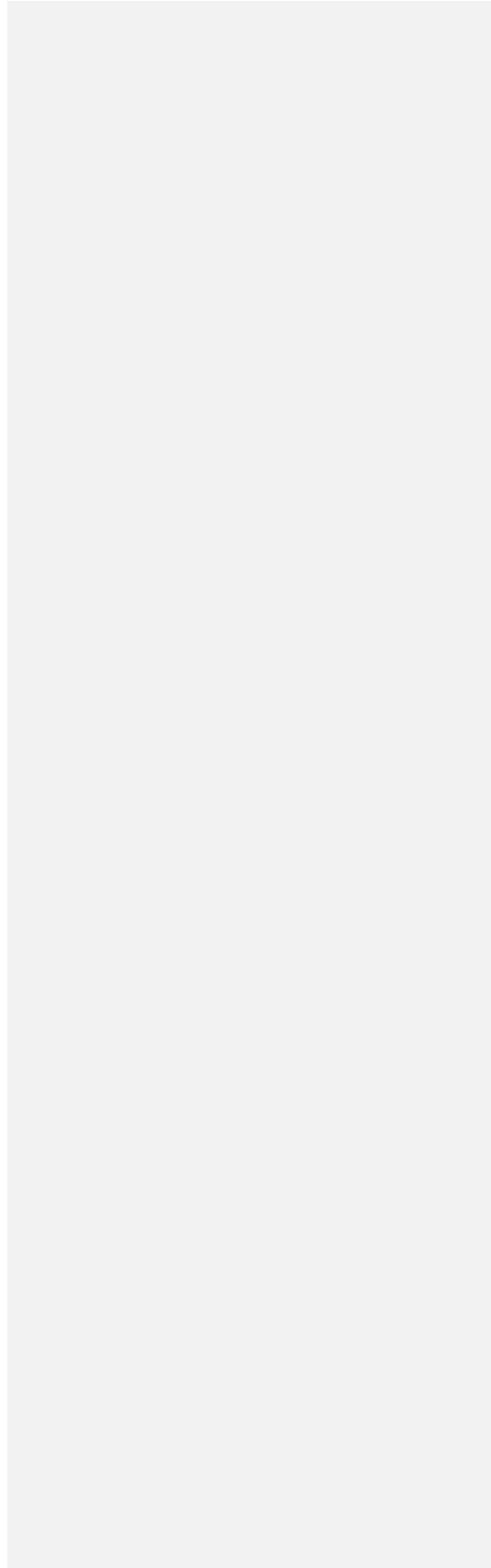
- 4
- After reasonable mixing:
- a. the discharge shall not result in the following effects in the open drain:

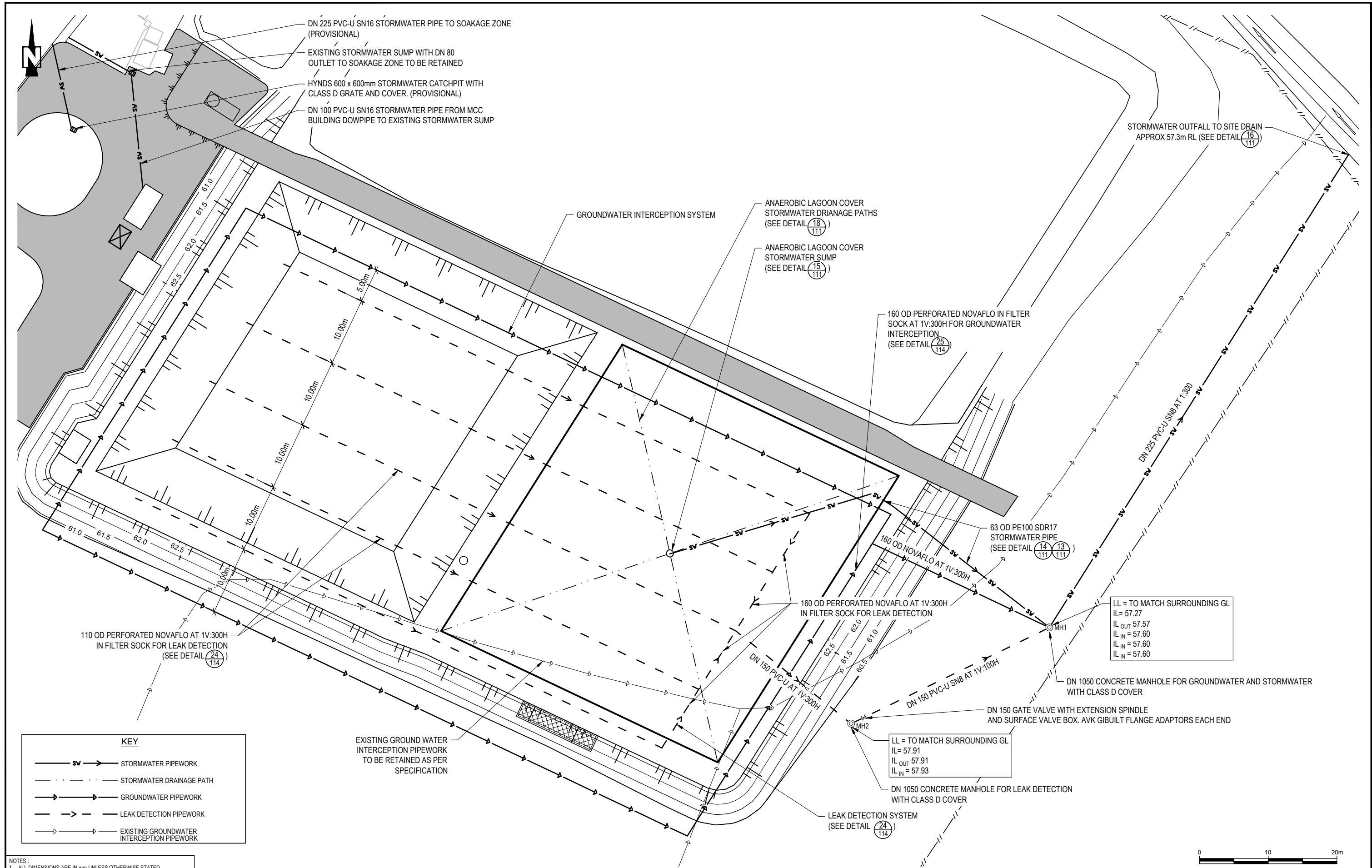
Proposed Conditions: Discharge of land drainage water and stormwater to water

	<ul style="list-style-type: none"> i. the production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials; ii. any conspicuous plumes, change in colour or reduction of visual clarity; iii. any emission of objectionable odour; <p>b. the discharge shall not result in the following effects in the tributary of the Waihopai River that the drain flows into:</p> <ul style="list-style-type: none"> i. the production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials; ii. any conspicuous plumes, change in colour or reduction of visual clarity iii. any emission of objectionable odour; iv. the rendering of fresh water as unsuitable for consumption by farm animals; v. any significant adverse effects on aquatic life; vi. exceedance of the water quality standards for “Lowland Hard Bed” water bodies (Appendix 1) (Attachment 2).
5	<p>For the purposes of Condition 4, reasonable mixing shall have occurred:</p> <ul style="list-style-type: none"> a. in the drain within 20 metres of the point of discharge to the drain, and b. in the tributary within 30 metres of the confluence of the drain with the tributary.
6	<p>Prior to the first discharge of stormwater from the covered anaerobic lagoon authorised by this consent, the Consent Holder shall notify Environment Southland of its intention to discharge the stormwater. The notification shall include:</p> <ul style="list-style-type: none"> a. a description of the measures implemented to prevent pest bird congregation on the covered anaerobic lagoon; b. evidence demonstrating the effectiveness of these measures over three months; and c. a minimum of two stormwater samples that meet the stormwater quality targets stated in Condition 3(c).

Attachment 1

A03220201 – Drawing No. 007





NOTES:
 1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
 2. SEE TO DWG 003 AND 004 FOR SETTING OUT DETAILS.
 3. THE IDENTITY AND LOCATION OF ANY SERVICES SHOWN ON THIS DRAWING CANNOT BE GUARANTEED TO BE COMPLETE OR ACCURATE.
 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL SERVICES PRIOR TO UNDERTAKING ANY EXCAVATION.

SOURCE:
 1. SURVEY DATA SUPPLIED BY BONISCH CONSULTANTS LTD. 181102 6700 Rev.B. SURVEYED ON 08/08/2018 AND 26/10/2018
 2. AERIAL IMAGERY (FLOWN 01/13/2016) DERIVED FROM GOOGLE EARTH PRO (MAY NOT BE SPATIALLY ACCURATE)

NO.	REVISION	DATE	APP.
0	FOR TENDER	DEC 18	
A	FOR REVIEW	NOV 18	

DESIGNED	BY	CHECKED	DATE
	A.D.	D.G.	OCT 18
DRAWN	D.F.P.	D.R.	OCT 18
APPROVED ISSUE FOR :	TENDER DEC 18		
APPROVED :			
THIS DRAWING IS NOT FOR CONSTRUCTION UNLESS SIGNED AS APPROVED			
COPYRIGHT ON THIS DRAWING IS RESERVED			

CLIENT:

PROJECT:	NEW WASTEWATER TREATMENT PLANT		
TITLE:	STORMWATER AND GROUNDWATER LAYOUT		
PROJECT NO. :	A03220201	SCALE 1:500	(A3)
SHEET :	OF :	DRAWING NO. :	REV. :
		007	0

PATTE DELAMORE PARTNERS LTD
 Level 4, PDP House, 235 Broadway, Newmarket, Auckland
 P.O. Box 9628, Auckland 1149, New Zealand.
 Telephone: (09) 523 6900
 Auckland Tauranga Wellington Christchurch

Proposed Conditions: Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land

1	This consent authorises the discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge, and stormwater from the covered anaerobic lagoon biosolids onto land at the following legal descriptions: Lot 1 DP 14802, Pt Lot 7 DP 159, Pt Lot 8 DP 159, Lot 1 DP 595, Lot 9 DP 159, Lot 12 DP 159, Lot 13 DP 159, Lot 292 DP 155, Lot 293 DP 155, Lot 1 DP 12194, and Lot 1 DP 8287.
2	Irrigation of wastewater, waste activated sludge, stormwater from the covered anaerobic lagoon biosolids, and land application of stockyard solids, paunch to third-party owned land shall only occur from October to March (inclusive). Third-party land is at the following legal descriptions: Lot 9 DP 159, Lot 12 DP 159, Lot 13 DP 159, Lot 292 DP 155, Lot 293 DP 155 Lot 1 DP 12194, and Lot 1 DP 8287.
3	No discharge shall occur onto land that is predominantly Paroa (formally Dacre) Silt Loam soils.
4	The Consent Holder shall permanently block or otherwise decommission the subsoil drainage underneath the irrigation areas prior to exercising this consent.
5	<p>The treated wastewater, waste activated sludge, stormwater from the covered anaerobic lagoon biosolids, stockyard solids and paunch authorised to be applied to land under this consent shall be applied no closer than:</p> <ul style="list-style-type: none"> a. 10 metres to any watercourse or open drain, whether flowing continuously or intermittently; b. 10 metres from any tile drain between 1 April and 30 September; b. 20 metres to any external property boundary or public road. The distance to a property boundary may be reduced with the written agreement of the adjacent property owner and occupier. A copy of this written agreement shall be provided to the Environment Southland Compliance Manager prior to disposal of treated wastewater, stockyard solids, paunch or waste activated sludge biosolids occurring; c. 100 metres to any residential dwelling, school, or marae (excluding any dwellings owned by the Consent Holder) unless the written agreement of the owner and occupier has been obtained. A copy of this written agreement shall be provided to the Environment Southland Compliance Manager prior disposal of wastewater, stockyard solids, paunch or waste activated sludge biosolids occurring; and d. 100 metres from any potable water abstraction point.

Commented [DR5]: This has been added because stormwater from the covered anaerobic lagoon is currently being directly to the irrigation lagoon and then discharged to land.

This will continue until the issue with birds congregating on the covered anaerobic lagoon is resolved.

Other proposed conditions in this consent have also been amended to reflect.

Proposed Conditions: Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land

Advice note: The above setback distances shall be calculated from the edge of the spray wetted radius. For example, an operator placing a pod irrigation system with a maximum spray radius of 15 metres should position the pods no closer than 25 metres to any watercourse.

Compliance limits

6	<p>The combined depth of treated wastewater, waste activated sludge and covered anaerobic lagoon stormwater application onto any area of land shall not exceed:</p> <ul style="list-style-type: none"> a. 35 mm for any individual application in the period 1 October to 31 March; b. 15 mm for any individual application in the period 1 April to 30 September. <p>The combined rate of application of treated wastewater, and/or waste activated sludge, and covered anaerobic lagoon stormwater biosolids to land must not exceed 6 mm per hour.</p>
7	<p>Discharge Following an individual application event discharge of treated wastewater, waste activated sludge and covered anaerobic lagoon stormwater biosolids must be withheld for a minimum period of 7 days before another individual application of that material can be applied onto the same area of land.</p>
8	<ul style="list-style-type: none"> a. Stock must be withheld from accessing the land area subject to a discharge event for a minimum of 14 days following the completion of that event. b. Land used for treated wastewater, waste activated sludge and covered anaerobic lagoon stormwater disposal between 1 April and 30 September shall not be grazed by cattle or horses.
9	<p>Plant available nitrogen loads from all sources must not exceed a maximum of:</p> <ul style="list-style-type: none"> a. 200 kgN/ha/yr on grazed pasture; b. 350 kgN/ha/yr on cut and carry operations; or c. A pro-rated nitrogen load, in the case of mixed land use. <p>Plant available nitrogen shall be assessed as follows:</p> <ul style="list-style-type: none"> a. nitrogen applied from treated wastewater, covered anaerobic lagoon stormwater, stockyard solids and paunch shall be considered as 100 % plant available; and

Proposed Conditions: Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land	
	b. nitrogen applied from waste activated sludge biosolids shall be considered 58 % plant available.
10	The annual phosphorus loading rate from the irrigation of treated wastewater, covered anaerobic lagoon stormwater, stockyard solids, paunch, waste activated sludge biosolids and fertiliser applications shall not exceed 70 kgP/ha/yr.
11	<p>The Consent Holder may apply plant available phosphorus up to 110 kgP/ha/yr on land owned by the Consent Holder and operated as cut and carry subject to:</p> <p>a. riparian planting as per the Riparian Planting Plan shown in (- Attachment 1 - Figure 17 Riparian Planting Plan for Mitigation of Higher Nutrient Loading) (PDP Figure No. 17 A03220205).</p> <ul style="list-style-type: none"> i. areas of new riparian planting shall be high density native grasses and sedges; and ii. achieve a minimum 80% ground cover; and iii. achieve a minimum of 5 m width as measured from the stream and/or drain bank. <p>b. areas of existing riparian planting are to be maintained wherever possible. If these need to be removed, the planting shall be replaced in accordance with Condition 11 (a) i-iii above.</p> <p>c. the riparian planting shall be carried out with the advice of a suitably qualified expert.</p>
12	<p>Plant available phosphorus shall be assessed in Conditions 10 and 11 as follows:</p> <p>a. phosphorus applied from treated wastewater, stockyard solids and paunch shall be considered 100 % plant available; and</p> <p>b. phosphorus applied from waste activated sludge biosolids shall be considered 85 % plant available.</p>
<u>12 - 1</u>	<u>The nitrogen loading rate shall not exceed 50 kgN/ha per irrigation application event.</u>
13	The oil and grease concentration of the treated wastewater discharged shall not exceed 50 grams per cubic metre.

Monitoring, record keeping and reporting

Proposed Conditions: Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land

<p><u>13 - 1</u></p>	<p>The Consent Holder shall maintain flowmeters at or downstream of the irrigation storage lagoon that provide instantaneous flow monitoring and daily discharge volume monitoring of all treated wastewater, waste activated sludge and covered anaerobic lagoon stormwater discharged to land.</p> <p>The flowmeter shall be maintained and calibrated annually.</p>
<p><u>13 - 2</u></p>	<p>The Consent Holder shall maintain daily records of all stockyard solids, paunch and grit spread onto land. The records shall include:</p> <ul style="list-style-type: none"> a. <u>volume; and</u> b. <u>type (stockyard solids, paunch, grit).</u>
<p>14</p>	<p>The Consent Holder shall monitor the treated wastewater <u>and covered anaerobic lagoon stormwater</u> discharge by taking representative samples of the wastewater from the irrigation storage pond at least once per month, and analysing each sample for the following:</p> <ul style="list-style-type: none"> a. <u>field measurements of temperature, pH, electrical conductivity, and dissolved oxygen;</u> b. sodium adsorption ratio <u>including sodium, potassium, calcium and magnesium concentrations;</u> c. <u>chloride concentration electrical conductivity;</u> d. total nitrogen concentration; e. nitrate nitrogen concentration; f. nitrite nitrogen concentration; g. ammoniacal nitrogen concentration; h. e. coli concentration; i. total phosphorus concentration; and j. dissolved reactive phosphorus.
<p><u>14-1</u></p>	<p><u>In addition to the analysis required by Conditions 14, one treated wastewater and covered anaerobic lagoon sample shall also be analysed annually for:</u></p> <ul style="list-style-type: none"> a. <u>total arsenic;</u> b. <u>total cadmium;</u> c. <u>total chromium;</u> d. <u>total copper;</u>

Proposed Conditions: Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land

	<p>e. <u>total lead;</u></p> <p>f. <u>total nickel; and</u></p> <p>g. <u>total zinc.</u></p>
15	<p>The Consent Holder shall monitor the <u>waste activated sludge biosolids by taking a representative sample</u> at least once per month, and analysing each sample for the following:</p> <ul style="list-style-type: none"> a. total solids; b. total kjeldahl nitrogen; c. ammoniacal nitrogen; d. total phosphorus; and e. dissolved reactive phosphorus.
16	<p>The Consent Holder shall monitor heavy metal concentrations in the biosolids by taking representative samples annually, and analysing each sample for the following:</p> <p><u>In addition to the analysis required by Conditions 15, one waste activated sludge discharge sample shall also be analysed for:</u></p> <ul style="list-style-type: none"> a. total arsenic; b. total cadmium; c. total chromium; d. total copper; e. total lead; f. total nickel; and g. total zinc.
17	<p>The Consent Holder shall monitor the combined paunch, stockyard solids and all other solids (combined as wastewater solids) applied to land by taking representative samples of the solids at least once per month, and analysing each sample for the following:</p> <ul style="list-style-type: none"> a. <u>bulk density;</u> b. total solids; c. total kjeldahl nitrogen; d. ammoniacal nitrogen;

Proposed Conditions: Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land

	<ul style="list-style-type: none"> e. total phosphorus; and f. dissolved reactive phosphorus.
<p><u>17-1</u></p>	<p><u>In addition to the analysis required by Conditions 17, one wastewater solids sample shall also be analysed annually for:</u></p> <ul style="list-style-type: none"> a. <u>total arsenic;</u> b. <u>total cadmium;</u> c. <u>total chromium;</u> d. <u>total copper;</u> e. <u>total lead;</u> f. <u>total nickel; and</u> g. <u>total zinc.</u>
<p>18</p>	<p>The Consent Holder shall monitor the unnamed tributary of the south branch of the Waihopai River that runs through the disposal area as follows:</p> <ul style="list-style-type: none"> a. the unnamed tributary is to be monitored upstream and downstream of the land treatment site, at the locations shown in Attachment 2 - Figure 11 Surface Water Monitoring Locations – (PDP Figure No. 11 A03220205); b. samples are to be taken at least once <u>per every three</u> months; c. the samples taken at the upstream and downstream sites on each monitoring occasion are to be taken at about the same time, within the period of 1 hour. The downstream sample should be taken first on each occasion; d. the samples are to be analysed for: <ul style="list-style-type: none"> i. pH; ii. electrical conductivity; iii. dissolved oxygen concentration; iv. ammoniacal nitrogen concentration; v. total nitrogen concentration; vi. dissolved reactive phosphorus concentration; vii. e. coli concentration; viii. nitrate nitrogen; ix. nitrite nitrogen; x. temperature (field measurement); and xi. <u>5-day</u> carbonaceous biochemical oxygen demand (cBOD₅).

Proposed Conditions: Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land	
	<p>e. In addition to the analysis required by Condition 18(d), one set of samples shall also be analysed in the first year of operation and every three years after that for:</p> <ul style="list-style-type: none"> i. total arsenic; ii. total cadmium; iii. total chromium; iv. total copper; v. total lead; vi. total nickel; and vii. total zinc.
19	<p>The Consent Holder shall maintain the conductivity meter at a site downstream of the land treatment area in the unnamed tributary. The conductivity meter shall be located in the position shown on Attachment 2 – Figure 11 Surface Water Monitoring Locations - (PDP Figure No. 11 A03220205). The conductivity meter shall continuously monitor and electronically record (at 15 minute intervals) electrical conductivity.</p> <ul style="list-style-type: none"> a. The meter shall be calibrated periodically, and shall be maintained in accordance with the manufacturers guidelines; b. the conductivity readings are to be reported to the Environment Southland Compliance Manager via a system that can automatically send the data into Environment Southland's computer database in CSV format, Hilltop or Tideda format, or XML formatted or formatted as required by the Environment Southland Compliance Manager. The data is to be provided at least once per day; and c. if the electrical conductivity readings exceed 280 $\mu\text{Ss}/\text{cm}$ (or other value agreed in writing by the Environment Southland Compliance Manager), the Consent Holder shall, without undue delay, inspect the unnamed tributary at the upstream and downstream sites identified in Attachment 2 - Figure 11 Surface Water Monitoring Locations (PDP Figure No. 11 A03220205). If the inspection shows a conspicuous change in the colour or clarity of the tributary, the Consent Holder shall advise the Environment Southland Compliance Manager (email: escompliance@es.govt.nz, or phone 0800 76 88 45) and shall immediately inspect the wastewater irrigation to ensure that wastewater is not causing the effect in the tributary.
20	<p>Water, treated wastewater, waste activated sludge biosolids, stockyard solids and paunch quality monitoring shall comply with the following criteria:</p>

Proposed Conditions: Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land

	<ul style="list-style-type: none"> a. the results of the monitoring specified in Conditions 14 to 18 are to be supplied to the Environmental Southland Compliance Manager no later than 20 working days after the receipt of the laboratory analytical data; b. the results of the monitoring specified in Conditions 14 to 18 are to include reference to the method of analysis; c. the parameters specified in conditions 14 to 18 shall be analysed in accordance with the most recent edition of APHA “Standard Methods for the Examination of Water and Wastewater” or by the methods approved in writing by the Environment Southland Compliance Manager; and d. where the laboratories carrying out analyses required by this consent are not accredited to ISO7025, either by IANZ (formerly TELARC) or by an organisation with a mutual recognition agreement with the IANZ, for those analyses, then the Environment Southland Compliance Manager may once every 12 months audit the Consent Holder’s monitoring methods and analyses by obtaining and analysing split samples of the samples taken in accordance with conditions 14 to 18 above. The cost of each audit is to be met by the Consent Holder.
21	<p>The Consent Holder shall monitor soil on the site during the month of May each year as follows:</p> <ul style="list-style-type: none"> a. Samples shall be taken from, and the measurements made in, at least seven treated wastewater, <u>waste activated sludge, covered anaerobic lagoon stormwater biosolids</u>, stockyard solids and paunch disposal sites: <ul style="list-style-type: none"> i. at least four sites on land operated as cut and carry; ii. at least two sites on land operated as grazed pasture; and iii. at least one control site (in an area where treated wastewater, <u>waste activated sludge biosolids</u>, stockyard solids and paunch are not discharged, <u>and which is typically representative of the soil characteristic within the irrigated areas</u>). b. to this end, the Consent Holder shall take no less than 10 representative subsamples to a minimum depth of 15 cm at each site to form one composite for each site; c. soil samples shall be analysed for the following: <ul style="list-style-type: none"> i. soil pH; ii. exchangeable calcium; iii. exchangeable magnesium; iv. exchangeable potassium; v. exchangeable sodium; vi. phosphorus (Olsen P); vii. cation exchange capacity; and

Proposed Conditions: Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land

	<ul style="list-style-type: none"> viii. total nitrogen concentration. d. analysis shall include the calculation of exchangeable sodium percentage (ESP) values for each sampling site; and e. at each site, at least one sample shall be taken and tested for soil infiltration. f. <u>In addition to the analysis required by Condition 21(c.), one set of samples shall also be analysed in the first year of operation and every five years after that for:</u> <ul style="list-style-type: none"> i. <u>total arsenic;</u> ii. <u>total cadmium;</u> iii. <u>total chromium;</u> iv. <u>total copper;</u> v. <u>total lead;</u> vi. <u>total nickel; and</u> vii. <u>total zinc.</u>
22	The Consent Holder shall maintain the soil's natural infiltration capacity by ensuring the exchangeable sodium percentage (ESP) of the soil at annual monitoring compliance sites does not exceed 5%, and that saturated soil infiltration rates are not less than 6 mm/hr.
23	If it is determined by monitoring required by Condition 21 that ESP exceeds 5%, action, such as fertilisation with gypsum or other suitable method, shall be undertaken such that the elevated ESP reduces to less than 5%.
24	If it is determined by monitoring required by Condition 21 that saturated soil infiltration rates are less than 6 mm/hr, the Consent Holder shall take appropriate remedial action by ripping the paddock, tilling the paddock and resowing, or other suitable mechanical method.
25	<p>After the first full year of authorised irrigation, and at five yearly intervals thereafter, the Consent Holder shall take composite soil samples from the locations in Condition 21(a) following the requirements in Condition 21(b) and analyse these for arsenic, cadmium, copper, chromium, zinc, nickel, and lead.</p> <p><i>Advice Note: The monitoring required by this Condition should, wherever possible, coincide with the monitoring required by Condition 21.</i></p>
26	The Consent Holder shall maintain a minimum of seven groundwater monitoring bores on site. The bores shall comprise a minimum of three shallow upgradient, three shallow downgradient and one deep (approximately 40 metres deep)

Commented [DR6]: Condition 21(f) replaces this.

Proposed Conditions: Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land

downgradient bores. The bores shall be positioned to achieve effective coverage of the operation.

The consent Holder shall sample the seven groundwater monitoring bores quarterly each year and analyse each sample test for the following:

- a. field measurements of temperature, pH, electrical conductivity, and dissolved oxygen;
- b. sodium adsorption ratio including sodium, potassium, calcium and magnesium concentrations;
- c. chloride concentration;
- d. total nitrogen concentration;
- e. nitrate nitrogen concentration;
- f. nitrite nitrogen concentration;
- g. ammoniacal nitrogen concentration;
- h. e. coli concentration;
- i. total phosphorus concentration; and
- j. dissolved reactive phosphorus.

pH, electrical conductivity, ammonium-N, nitrate-N, dissolved reactive phosphorus, E coli, sodium, and chloride.

The monitoring bores are located as follows (NZTM coordinates):

- a.—CG11/0016 (Consent holder reference MW1D) 1263261E 4857819N (depth 10 m)
- b.—CG11/0017 (Consent holder reference MW1D) 1263261E 4857819N (depth 40 m)
- c.—CG11/0018 (Consent holder reference MW1U) 1263762E 4858472N (depth 10 m)
- d.—CG11/0019 (Consent holder reference MW2D) 1264081E 4857674N (depth 10 m)
- e.—CG11/0020 (Consent holder reference MW2U) 1264988E 4858679N (depth 10 m)
- f.—CG11/0021 (Consent holder reference MW3D) 1264809E 4857227N (depth 10 m)
- g.—CG11/0022 (Consent holder reference MW3U) 1265681E 4858461N (depth 10 m)

Proposed Conditions: Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land

27	<p>From the date that this consent commences, in addition to the monitoring requirements stipulated by Condition 26, the Consent Holder shall also sample bore water at the seven bores identified in Condition 26 for heavy metals <u>total arsenic, total cadmium, total chromium, total copper, total lead, total nickel and total zinc in the first year of operation and at five yearly intervals after that.</u></p>
28	<p>The Consent Holder shall carry out, on-site soil moisture measurements within the wastewater irrigation areas as follows:</p> <ul style="list-style-type: none"> a. the Consent Holder shall record soil-moisture measurements using a device as agreed by the Environment Southland Compliance Manager; b. unless otherwise agreed by the Environment Southland Compliance Manager the soil moisture data collected in accordance with this condition is to be recorded and <u>provided to the Council with each annual monitoring report required by Condition 31 for the preceding period 1 July to 30 June made available to the Council on request;</u> c. the Consent Holder shall, from the on-site monitoring record, determine the soil-moisture contents that are equivalent to field capacity at each of the monitoring sites and shall report this to the Environment Southland Compliance Manager.
29	<p>The Consent Holder shall, unless otherwise agreed to in writing by the Environment Southland Compliance Manager, undertake ecological monitoring after the first full year of treated wastewater, <u>waste activated sludge, covered anaerobic lagoon stormwater biosolids,</u> stockyard solids and paunch disposal and at 5 yearly intervals after that. The ecological monitoring shall occur along approximately 50 m lengths of the two unnamed tributaries, upstream and downstream of the boundaries of the disposal area. These locations shall be monitored at the same time.</p> <p>The ecological monitoring shall comprise of:</p> <ul style="list-style-type: none"> a. macroinvertebrate community index for soft bottomed streams (MCI-sb); b. relative abundance of ephemeroptera, plecoptera and trichoptera (EPT); c. taxonomic richness; d. stream ecological evaluation (SEV); <u>and</u> e. <u>periphyton sampling</u>
30	<p>The Consent Holder shall keep daily records on a per paddock basis of the following:</p>

Proposed Conditions: **Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land**

	<p>a. the amount of:</p> <ul style="list-style-type: none"> i. treated wastewater <u>and covered anaerobic lagoon stormwater</u> irrigation; and ii. <u>waste activated sludge biosolids</u> irrigation; and iii. paunch, stockyard solids, and all other solids applied to the land. <p>b. the total nitrogen and phosphorus loadings applied to the disposal area from:</p> <ul style="list-style-type: none"> i. treated wastewater <u>and covered anaerobic lagoon stormwater</u> irrigation; ii. <u>waste activated sludge biosolids</u> irrigation; and iii. paunch, stockyard solids, and all other solids applied to the land. <p>c. the calculated available nitrogen and available phosphorus loading applied to the disposal area (<u>in kilograms per hectare per year</u>).</p> <p>The Consent Holder shall make these records available to the Environment Southland Compliance Manager upon request at any reasonable time.</p>
31	<p>The Consent Holder shall prepare and submit an Annual Monitoring Report to the Environment Southland Compliance Manager. The report shall include the 1 July to 30 June period and shall be provided to the Environment Southland Compliance Manager by 31 August each year. The report shall include, but not be limited to the following information:</p> <ul style="list-style-type: none"> a. presentation and summary of all treated wastewater, <u>waste activated sludge biosolids, covered anaerobic lagoon stormwater</u>, stockyard solids, paunch, receiving environment, and biological monitoring results as required by this consent; including any recommendations for improved monitoring; b. the identification of any recorded non-compliances with consent limits and standards and the measures taken to ensure compliance is achieved; c. <u>analysis of all treated wastewater, wastewater activated sludge, stockyards solids, paunch, receiving environment and ecological monitoring results using:</u> <ul style="list-style-type: none"> i. <u>long-term monitoring trends (where sufficient data is available);</u> ii. <u>comparison of environmental monitoring data with relevant standards and guidelines, where available, including but not limited to National Policy Statement for Freshwater Management national bottom lines (for surface water), Environment Southland standards (various), Wilcox diagram (for groundwater); and</u>

Proposed Conditions: Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land	
	<p>e. assessment of the effects of the discharges on the receiving environment; and</p> <p>d. any corrective actions undertaken as required by Conditions 23 and 24.</p>
32	The Consent Holder shall provide to the Environment Southland Compliance Manager by 31 August each year a nutrient management budget for the irrigation area including the overall grazed-farm, that has been developed based on the outputs of either Overseer or any other nutrient management planning tool approved by the Environment Southland Compliance Manager.
33	<p>The nutrient management budget required by Condition 32 shall as a minimum record the following information for at least nitrogen (N) and phosphorus (P) (in units of kilograms of N and P per hectare per year):</p> <p>a. Inputs from treated wastewater, <u>covered anaerobic lagoon stormwater</u> and <u>waste activated sludge biosolids</u> irrigation, other solids spreading, fertiliser, and any nutrient source;</p> <p>b. Outputs in product, including percentage dry matter; and</p> <p>c. Results of soil testing.</p> <p><u>The information recorded in accordance with this condition shall be separated by land used for cut and carry and land used for grazed pasture.</u></p>
Management	
34	The irrigation of treated wastewater, <u>and/or waste activated sludge, and covered anaerobic lagoon stormwater biosolids</u> shall not cause significant prolonged ponding. For the purpose of this consent, significant prolonged ponding is deemed to occur if treated wastewater, <u>and/or waste activated sludge, and covered anaerobic lagoon stormwater biosolids</u> remains on an area of more than ten square metres 24 hours after being irrigated.
35	The treated wastewater, <u>and/or waste activated sludge, and covered anaerobic lagoon stormwater biosolids</u> irrigation shall not cause overland flow of treated wastewater and/or <u>waste activated sludge biosolids</u> to any flowing watercourse, drainage ditch, permanent pond, or property outside the boundary of this Consent.
36	If treated wastewater, <u>and/or waste activated sludge, and covered anaerobic lagoon stormwater biosolids</u> irrigation occurs when soils are at or above field capacity as determined by Condition 28, the Consent Holder shall take

Proposed Conditions: Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land

	<p>additional precautions, including but not limited to, minimum daily inspections of each of the irrigators while irrigating to check for conspicuous signs of wastewater ponding or run-off and the position of the irrigator relative to known drains. These inspections shall be noted, and the upstream and downstream conductivity recorded at the time of the inspection.</p> <p>A copy of this record shall be included with the Annual Monitoring Report specified in Condition 31.</p>
37	<p>Irrigation of wastewater and covered anaerobic lagoon stormwater shall be with equipment such that aerosols and spray drift are minimised, and there shall be no detectable spray drift beyond the property boundary.</p>

Complaints

38	<p>The Consent Holder shall maintain a diary of complaints for complaints received by the Consent Holder about all aspects of operations at the site.</p> <p>The diary shall record:</p> <ul style="list-style-type: none"> a. the issue that observed by the complainant; b. the date and time the issue was detected, or the complaint was made; c. the location where the issue was detected by the complainant; d. weather conditions (such as wind direction, approximate wind speed, temperature and rain) when the issue was detected by the complainant; e. the most likely cause of the issue detected; f. the action taken by the Consent Holder in response to the complaint. <p><i>Advice Note: This condition does not require the Consent Holder to take action over every complaint, but it does require that that decision is recorded.</i></p>
39	<p>The complaints register required by Condition 38 shall be available to the Environment Southland Compliance Manager on request. Complaints received by the Consent Holder which may indicate non-compliance with the conditions of this consent shall be forwarded to Environment Southland Compliance Manager within 5 days of the complaint being received. The complaint information provided to the Environment Southland Compliance Manager shall include all information recorded in Condition 38 above.</p>

Proposed Conditions: Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land

40 Details of all complaints received in accordance with Condition 38 shall be forwarded to the Environment Southland Compliance Manager on a monthly basis.

Incident management

41 The Consent Holder shall notify, in the event of any treatment system failure which may cause a public health nuisance or risk, or the discharge of wastes to areas other than the disposal field, without undue delay, both the Medical Officer of Health (or Health Protection Officer) and the Environment Southland Compliance Manager, as appropriate.

42 Should an adverse event occur that results in a non-compliance with the Conditions of this Consent, the Consent Colder shall notify the Environment Southland Compliance Manager immediately and shall provide a written report to the Environment Southland Compliance Manager within five working days of the Environment Southland Compliance Manager being notified. The report shall specify:

- a. The cause or likely cause of the event and any factors that influenced its severity;
- b. The nature and timing of any measures implemented by the Consent Holder to avoid, remedy, or mitigate adverse effects; and
- c. the action to be taken in future to prevent recurrence of similar events.

Wastewater Farm Environmental Management Plan

43 No later than three months from the consent commencing the Consent Holder shall prepare and submit to the Environment Southland Compliance Manager an updated Wastewater Farm Environment Management Plan for certification that it is in accordance with this condition.

The objective of the Wastewater Farm Environmental Management Plan shall be to detail all actions to be taken to minimise the impacts of the activities authorised by this consent and to ensure compliance with the conditions of this consent.

The Wastewater Farm Environmental Management Plan shall include:

Proposed Conditions: Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land

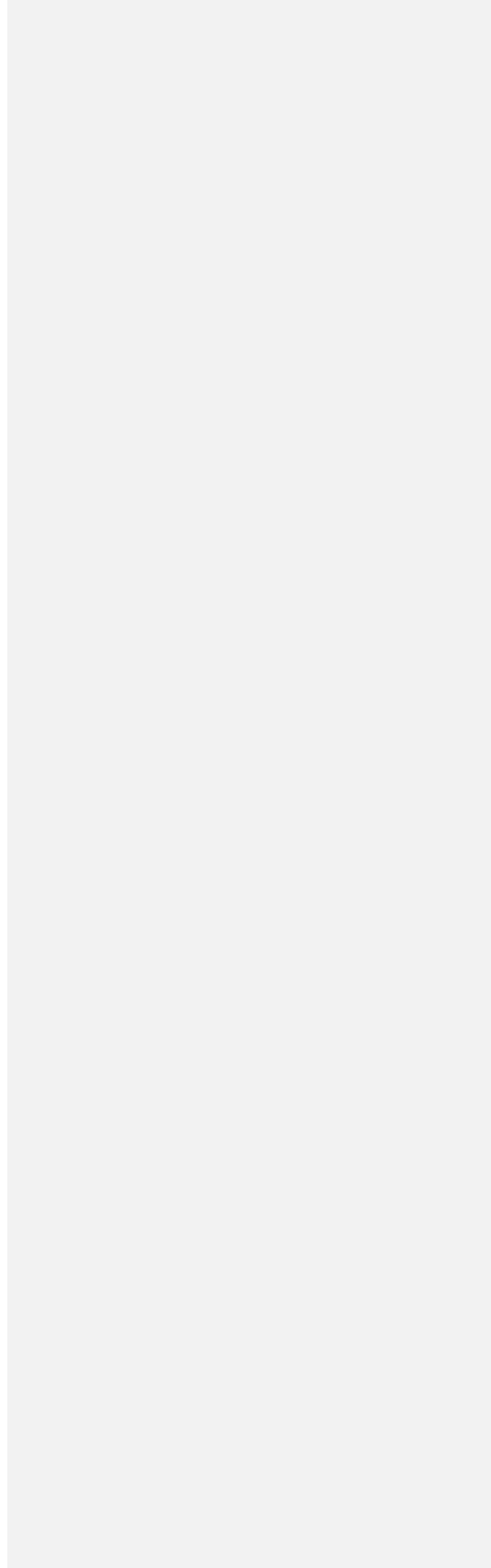
	<ul style="list-style-type: none"> a. a description of the contents and purpose of the Wastewater Farm Environmental Management Plan in accordance with this condition; b. responsibilities and contact details of key personnel; c. a summary of the plant purpose, location, layout, and wastewater management infrastructure with specific reference to the treated wastewater, <u>waste activated sludge, covered anaerobic lagoon stormwater biosolids</u>, stockyard solids and paunch discharge; d. a description of how the following will be managed to ensure compliance with the conditions of this consent: <ul style="list-style-type: none"> i. disposal buffer zones; ii. irrigation depths and nutrient loading rates; iii. withholding periods; iv. riparian planting; v. monitoring; vi. records of monitoring <u>and of treated wastewater and covered anaerobic lagoon stormwater, waste activated sludge biosolids</u>, stockyard solids and paunch application; vii. reporting; and viii. complaints management. e. a description of how soil moisture monitoring, <u>including restricting irrigation to time when soil moisture is below field capacity (where practical)</u>, will be used to assist in the management of irrigation, including the avoidance of significant ponding and overland flow; f. a description of how treated wastewater, <u>and/or waste activated sludge, and covered anaerobic lagoon stormwater biosolids</u> irrigation will be managed to ensure there is no detectable spray drift beyond the property boundary; and g. details of how incidents will be managed, including reporting requirements.
44	<p>The Consent Holder shall undertake all onsite activities in accordance with the certified Wastewater Farm Environmental Management Plan, and all other conditions of this consent. In the event of any inconsistencies between the conditions of consent and the provisions of the Wastewater Farm Environmental Management Plan, the conditions of this consent shall apply.</p>
45	<p>The Wastewater Farm Environmental Management Plan shall be reviewed by the Consent Holder every three years. The purpose of this review shall be to confirm that the Wastewater Farm Environmental Management Plan accurately reflects current on-site activities and operations and to identify if changes to procedures contained within the Wastewater Farm Environmental Management</p>

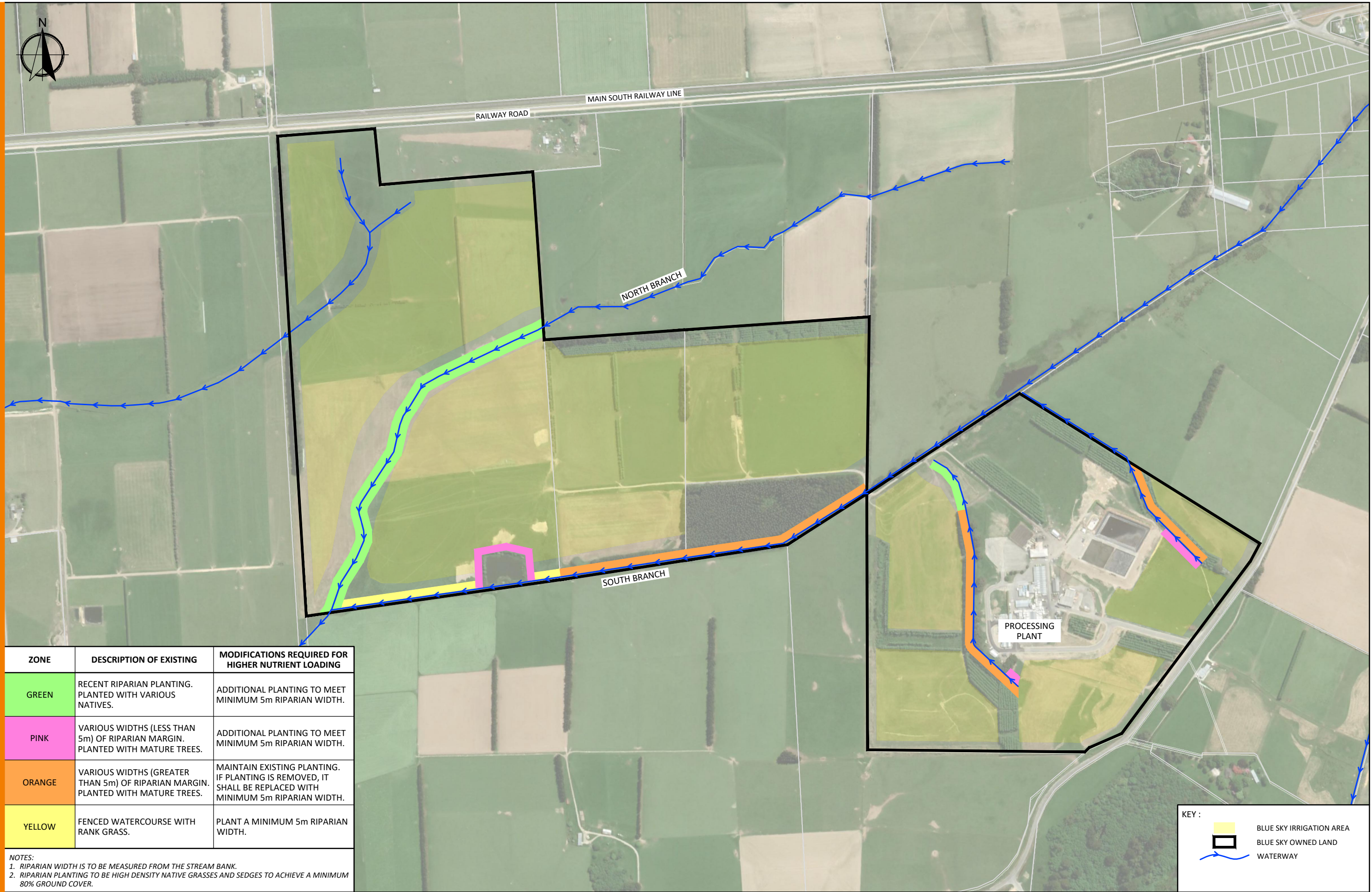
Proposed Conditions: Discharge of treated wastewater, stockyard solids, paunch, and waste activated sludge and stormwater biosolids to land

Plan are required to achieve the objective of this condition. A written report detailing the results of the review shall be submitted to the Environment Southland Compliance Manager within 30 working days of the review being undertaken. If the review results in amendments to the Wastewater Farm Environmental Management Plan, the amended sections shall be provided to the Environment Southland Compliance Manager for certification at this time.

Attachment 1

Figure 17 – Riparian Planting Plan for Mitigation of Higher Nutrient Loading (PDP Figure No. 17 A03220205)



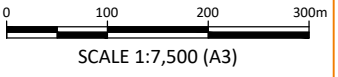


ZONE	DESCRIPTION OF EXISTING	MODIFICATIONS REQUIRED FOR HIGHER NUTRIENT LOADING
GREEN	RECENT RIPARIAN PLANTING. PLANTED WITH VARIOUS NATIVES.	ADDITIONAL PLANTING TO MEET MINIMUM 5m RIPARIAN WIDTH.
PINK	VARIOUS WIDTHS (LESS THAN 5m) OF RIPARIAN MARGIN. PLANTED WITH MATURE TREES.	ADDITIONAL PLANTING TO MEET MINIMUM 5m RIPARIAN WIDTH.
ORANGE	VARIOUS WIDTHS (GREATER THAN 5m) OF RIPARIAN MARGIN. PLANTED WITH MATURE TREES.	MAINTAIN EXISTING PLANTING. IF PLANTING IS REMOVED, IT SHALL BE REPLACED WITH MINIMUM 5m RIPARIAN WIDTH.
YELLOW	FENCED WATERCOURSE WITH RANK GRASS.	PLANT A MINIMUM 5m RIPARIAN WIDTH.

NOTES:
 1. RIPARIAN WIDTH IS TO BE MEASURED FROM THE STREAM BANK.
 2. RIPARIAN PLANTING TO BE HIGH DENSITY NATIVE GRASSES AND SEDGES TO ACHIEVE A MINIMUM 80% GROUND COVER.

KEY :

- BLUE SKY IRRIGATION AREA
- BLUE SKY OWNED LAND
- WATERWAY



THIS DRAWING REMAINS THE PROPERTY OF PATTLE DELAMORE PARTNERS LTD AND MAY NOT BE REPRODUCED OR ALTERED WITHOUT WRITTEN PERMISSION. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORISED USE OF THIS DRAWING.

B	FOR CONSENT	JUN 22
A	DRAFT	APR 22
NO.	REVISION	DATE

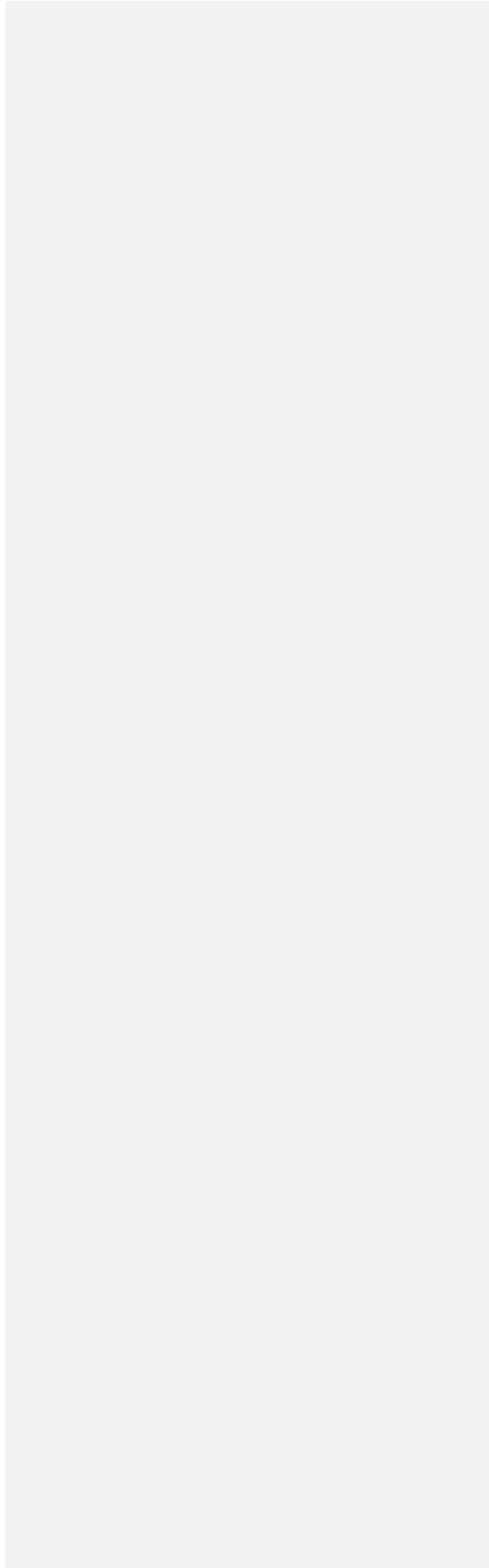
SOURCE:
 1. AERIAL IMAGERY (FLOWN NOV 2019) DERIVED FROM GOOGLE EARTH PRO (MAY NOT BE SPATIALLY ACCURATE).
 2. CADASTRAL INFORMATION (AS AT 06/12/2021) DERIVED FROM LINZ DATA.

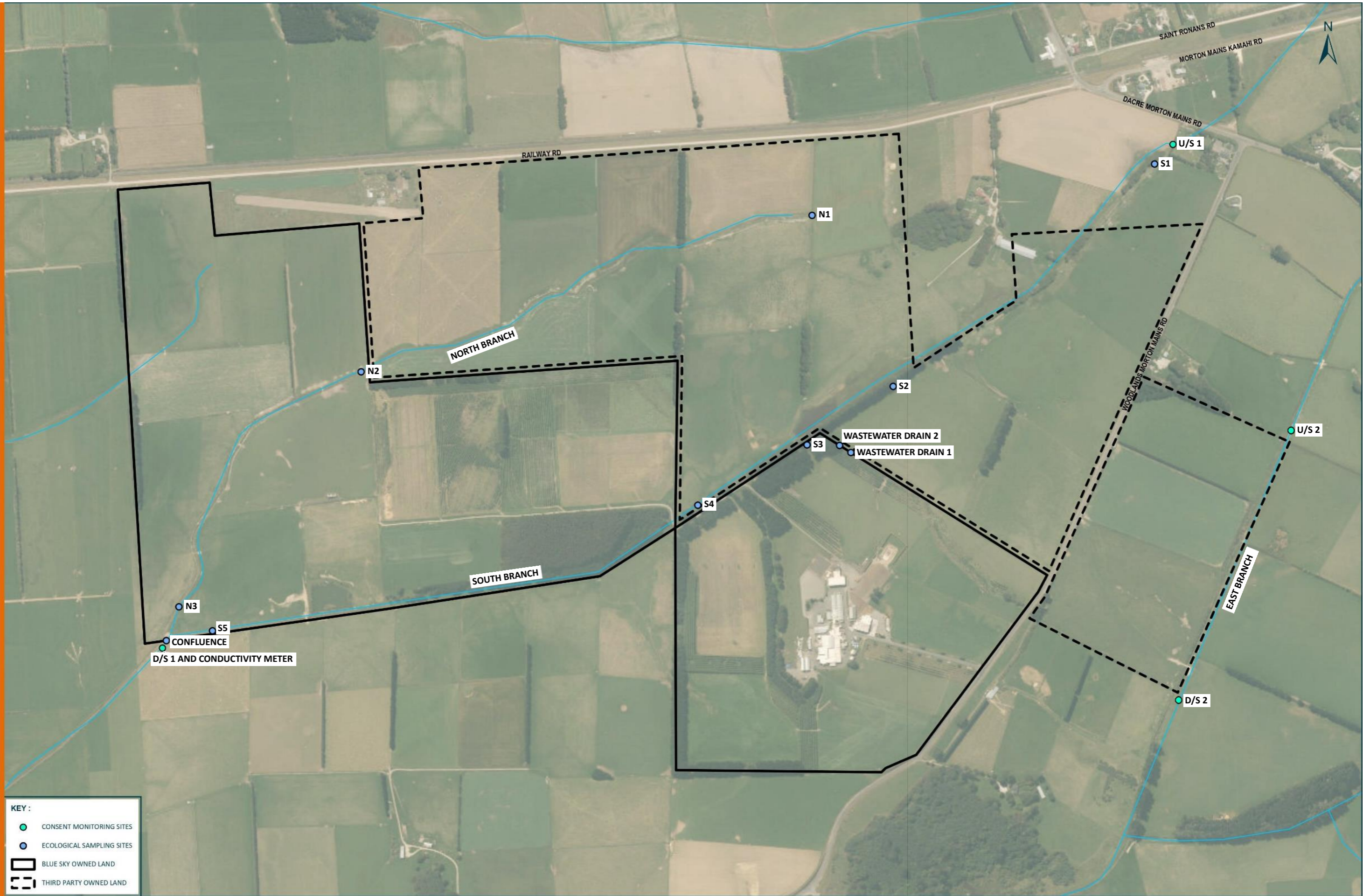


FIGURE
FIGURE 17: RIPARIAN PLANTING PLAN FOR MITIGATION OF HIGHER NUTRIENT LOADING
 PROJECT
 LAND TREATMENT OF WASTEWATER AND BIOSOLIDS - ASSESSMENT OF ENVIRONMENTAL EFFECTS

Attachment 2

Figure 11 Surface Water Monitoring Locations (PDP Figure No. 11 A03220205)





KEY :

- CONSENT MONITORING SITES
- ECOLOGICAL SAMPLING SITES
- BLUE SKY OWNED LAND
- THIRD PARTY OWNED LAND



THIS DRAWING REMAINS THE PROPERTY OF RTTLLE DELAMORE PARTNERS LTD AND MAY NOT BE REPRODUCED OR ALTERED WITHOUT WRITTEN PERMISSION. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORIZED USE OF THE DRAWING.

A	DRAFT	MAR 22	TK
NO.	REVISION	DATE	BY

SOURCE:
 1. AERIAL IMAGERY (FLOWN 2017-2020) SOURCED FROM THE LINZ DATA SERVICE www.linz.govt.nz/about-linz/linz-data-service/help/using-linz-data/attribution-aerial-imagery-data AND LICENCED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
 2. WELL DATA SOURCED FROM SOUTHLAND REGIONAL COUNCIL REST SERVICES.



FIGURE
FIG 11: SURFACE WATER MONITORING LOCATIONS

PROJECT
 LAND DISCHARGE OF WASTEWATER AND BIOSOLIDS – TECHNICAL ASSESSMENT OF ENVIRONMENTAL EFFECTS



APPENDIX F

Blue Sky Meats Air Discharge
Management Plan



Air Discharge Management Plan

Table of Contents

1	Introduction	4
1.1	Site Overview	4
1.2	Air Discharge Management Plan Overview	4
1.3	Resource Consents Overview	5
1.4	Compliance Management Summary	6
2	Description of Operations and Discharges to Air	8
2.1	Site overview	8
2.2	Stockyards	9
2.3	Wastewater Treatment	9
2.4	Wastewater Irrigation	10
2.5	Boiler Operations	11
2.6	Rendering	11
2.7	Blood Processing	12
3	Air Emission Controls and Monitoring	13
3.1	Primary Discharges to Air Summary	13
3.2	Stockyards	13
3.3	Wastewater Collection and Treatment	14
3.4	Wastewater Irrigation	14
3.5	Boiler Operations	14
3.6	Rendering and Blood Drying	15
3.7	Odour Control Biofilter	15
4	Responsibilities	15
5	Contingency Measures	16
6	Odour Complaints	17
7	Community Liaison	17
8	Audit and Review	17
9	Blue Sky Meats Contacts	17
	Appendix 1 – Air Discharge Permit: AUTH-201193-V5	19
	Appendix 2 – Air Discharge Permit: AUTH-20181937-04	25
	Appendix 3 – Odour Complaint Form	29
	Appendix 4 – Amendment Register	30

Tables

Table 1: BSM Resource Consents (Morton Mains Site)	6
Table 2: Air Discharge Management Plan Compliance Management Summary – AUTH-201193-V5	7
Table 3: Air Discharge Management Plan Compliance Management Summary – AUTH-20181937-04	8

Table 4: Boiler Operations Limits	11
Table 5: Processing Operations Limits.....	12
Table 6: Primary Potential Air Emissions and Controls Summary	13
Table 7: Air Emissions Contingency Measures	17

Figures

Figure 1: Layout of Blue Sky Meats Plant	9
Figure 2: Wastewater Discharge Location.....	10

1 Introduction

1.1 Site Overview

Blue Sky Meats (NZ) Limited (BSM) operate a meat processing plant at Morton Mains in Southland (the Site), providing employment to over 350 staff across Southland and Auckland. Operations started in 1987 on the present site, with current production capacity able to process up to 30,000 animals per week based on a 20 hours per day, six day per week operation at peak season. However, at present, the site is processing up to 27,750 animals per week.

Operations on site include meat processing, and a rendering and bleeding drying plant which provide a range of boutique and specialist cuts primarily for export. Key activities are:

- Stockyards
- Slaughter
- Boning
- Chilled and frozen storage
- Rendering, blood drying and associated odour control biofilter
- Coal-fired boilers
- Engineering workshop
- Water abstraction, treatment and storage
- Wastewater collection and treatment, including a biological treatment plant, and
- Wastewater irrigation to land.

BSM hold various resource consents from the Southland Regional Council (ES) and Southland District Council (SDC) to authorise activities associated with the Site, include their take of groundwater, discharges to land and air, and various land use activities.

1.2 Air Discharge Management Plan Overview

The objective of this Air Discharge Management Plan (ADMP) is summarised by two specific conditions, being:

- Condition 16 of Air Discharge Permit AUTH-201193-V5 outlines the objectives for the ADMP as follows:

To minimise odour and particulate matter emissions from the plant and to ensure compliance with the conditions of air permit 201193-V5.

- Condition 17 of Air Discharge Permit AUTH-201193-V5 outlines a specific objective for odour emissions as follows:

The discharges shall not cause odour that is offensive or objectionable to such an extent that it has an adverse effect on the environment beyond the boundary of the property on which the consent is exercised.

Condition 16 of Consent AUTH-201193-V5 (refer to Appendix 1) requires BSM to prepare a Site Management Plan as follows:

Condition 16. Management Plan:

- (a) *By the 31st December 2015, an updated site management plan shall be prepared and provided to the Consent Authority for approval. This management plan shall detail all actions to be taken to minimize odour and particulate matter emissions from the plant and to ensure compliance with the conditions of this consent. The plan shall address:*
- (i) Wastewater collection and treatment, including maximum holding times;*
 - (ii) Wastewater irrigation procedures and minimum setback distances; and*
 - (iii) Boiler plant maintenance.*
- (b) *Within three months of commissioning of the rendering plant, an update of the plan shall be submitted to the Council's Manager of Environmental Compliance. The update shall include the above matters and the following:*
- (i) Biofilter maintenance requirements;*
 - (ii) Operating procedures to minimise odour emissions from the rendering and blood-drying plant.*
- (c) *The management plan shall state the name and contact telephone number of all persons responsible for each action described in the plan and shall be updated at least annually to include staff changes. The plan shall be available for inspection at the consent holder's property at all times.*

This ADMP seeks to fulfil the requirements of Condition 16 of AUTH-201193-V5 and also to provide a reference document for BSM Staff to ensure compliance with relevant regulatory requirements.

Note:

- This ADMP is not intended to provide detailed Standard Operating Procedures (SOPs) for BSM staff. Where SOPs are required, staff should refer to the relevant Departmental SOP Manuals.
- BSM maintains an operational framework which includes a number of documents and procedures. In relation to air emissions and controls, the following documents provide additional operational information and/or mitigation and management information:
 - BSM Wastewater Farm Environmental Management Plan; and
 - Blue Sky Pastures – Wastewater Treatment Plant Operation and Maintenance Manual (PDP). This document in particular details operational information which ensures compliance with air discharges associated with the wastewater treatment plant and process, as authorised by Resource Consents AUTH-2011937-04 and AUTH-20181937-04.

This ADMP also seeks to ensure compliance with Air Discharge Permit AUTH-20181937-04, which was granted for the purpose of discharging contaminants to air from a wastewater treatment system.

1.3 Resource Consents Overview

BSM hold various resource consents from the ES and SDC to authorise activities associated with the Site, including their take of groundwater, discharges to land and air, and various land use activities. Table 1 provides a summary of the resource consents currently held by BSM:

Table 1: BSM Resource Consents (Morton Mains Site)

Consent Number	Permit Type	Activity	Granted	Expiry
AUTH-201190-V1	Water Permit	To take and use 1,000,000 l/day of groundwater for a meat processing plant and a rendering and blood drying plant at Morton Mains	3 Dec. 2002	31 Dec. 2022
AUTH-201191-V1	Discharge Permit	To discharge up to 1000 cubic metres of meat processing and rendering plant wastewater to land at Morton Mains via a spray irrigator	23 May 2003	31 Dec. 2022
AUTH-201193-V5	Air Discharge Permit	To discharge contaminants to the air from a meat processing plant, rendering and blood drying plant and associated boilers at Morton Mains	23 May 2003	31 Dec. 2022
AUTH-20181937-01	Land Use	To use land for the construction, maintenance and use of two new non-agricultural effluent storage facilities and ancillary structures and the reconstruction of a non-agricultural effluent storage facility at Morton Mains	28 Feb. 2019	31 Dec. 2022
AUTH-20181937-02	Water Permit	To take and use 302,400 l/day of groundwater for the purpose of dewatering at 729 Woodlands Morton Mains Road, Morton Mains	28 Feb. 2019	31 Dec. 2022
AUTH-20181937-03	Discharge Permit	To discharge stormwater and dewatering water to an artificial water body at Morton Mains	28 Feb. 2019	31 Dec. 2022
AUTH-20181937-04	Air Discharge Permit	To discharge contaminants to the air from a meat processing plant, rendering and blood drying plant and associated boilers at Morton Mains	28 Feb. 2019	31 Dec. 2022
AUTH-20202379	Land Use	To install seven bores for the purpose of monitoring at 729 Woodlands Morton Mains Road & 638 Railway Road, Morton Mains	8 Sept. 2020	1 Oct. 2023

1.4 Compliance Management Summary

Table 2 provides an overview of the requirements of Air Discharge Permit AUTH-201193-V5 and Table 3 provides an overview of the requirements of Air Discharge Management Permit AUTH-20181937-04 along with the corresponding sections of this ADMP in order to demonstrate that all requirements of the Consents have been provided for and are being actively managed by BSM.

Table 2: Air Discharge Management Plan Compliance Management Summary – AUTH-201193-V5

Condition	Requirement	Section Reference
1	Expiry 31 December 2022.	1.3
2	Location and authorised activity	1.1, 2
3	Boilers' capacities and coal burning rates	2.5, 3.5
4	Boiler opacity	2.5, 3.5
5	Boiler stack heights and design	2.5, 3.5
6	Coal composition limits	2.5, 3.5
7	Boiler emissions contaminant limits and monitoring methodologies	2.5, 3.5
8	Boiler emissions monitoring facilities	3.5
9	Boiler servicing and records	3.5
10	Rendering Plant processing restrictions	2.6
11	Rendering Plant building air pressure and ventilation via an odour control biofilter	2.6, 3.6
12	Rendering Plant odour control biofilter specifications	2.6, 3.6, 3.7
13	Processing Plants cleaning requirements	2.2, 3
14	Wastewater Storage Ponds facilities and management	2.3, 3.3
15	Wastewater irrigation spray drift controls	2.4, 3.4
16	Management Plan	All
17	Absence of objectional or offensive odours beyond property boundary	All
18	Complaints records and reporting	6
19	Complaints investigation and management	6
20	Fees and charges	N/A
21	Notice for intention of consent variation.	N/A
22	Application to vary conditions.	1.1

Table 3: Air Discharge Management Plan Compliance Management Summary – AUTH-20181937-04

Condition	Requirement	Section Reference
1	Location and authorised activity	1.1, 2
2	Odour and spray drift	2.3
3	Biogas management	3.1, 3.3
4	Wastewater treatment biofilter use reporting	3.3
5	Complaint records and reporting	6
6	After ours contact number	7
7	Notice of intention to review consent	N/A

2 Description of Operations and Discharges to Air

2.1 Site overview

Key activities are:

- Stockyards;
- Slaughter;
- Boning;
- Chilled and frozen storage;
- Rendering, blood drying and associated odour control biofilter;
- Offal pits;
- Coal-fired boilers;
- Engineering workshop;
- Water abstraction, treatment and storage;
- Wastewater collection and treatment, including a biological treatment plant, biogas flare and wastewater treatment plant biofilter; and
- Wastewater irrigation to land.



Figure 1: Layout of Blue Sky Meats Plant

2.2 Stockyards

Stock are transported to the plant in stock trucks and held in paddocks or stockyards, then washed prior to slaughter. The stockyards are roofed but have open sides to allow natural light and ventilation. The stock holding yards are elevated approximately 1m above ground level and the stock are held in mesh floor pens, which allow faecal material to drop through onto a concrete slab that is graded and slopes towards a drain. The pens are washed regularly by hosing, with faecal material being hosed to the drain. This prevents the accumulation of faecal material under the stock holding area and prevents the onset of anaerobic activity and the production and discharge of odours. The open nature of the yards and the natural ventilation that occurs as a consequence means these odours disperse rapidly and do not result in objectionable nor offensive odours beyond the site boundary.

2.3 Wastewater Treatment

Wastewater from the processing plant is currently collected in a number of sumps and pumped to

a 1mm Contra Shear screen where gross solids are removed prior to being discharged to a flow equalisation basin. Wastewater from the stock holding yards is discharged to a separate screen prior to being pumped to the contra shear screen. Wash water from the stock truck unloading areas and other stock holding areas is segregated and discharged to the wastewater system.

As part of BSM's compliance improvement strategy, BSM upgraded the wastewater system in 2017/18 which provided a new anaerobic lagoon and associated biogas collection and treatment system, and a new sequencing batch reactor (SBR) lagoon to provide significantly improved treatment of the wastewater. Treated wastewater is then temporarily stored in the irrigation lagoon prior to irrigation to land. Because the wastewater is highly treated, the risk of odour from storing treated wastewater is low. However the irrigation lagoon is equipped with an aeration system to prevent anoxic or anaerobic conditions in the pond so as to avoid the risk of objectionable odours from the pond itself as well as during the subsequent discharge of wastewater to land.

Blood is collected in the sticking area and pumped via a screen to remove wool to holding tanks. BSM makes every effort to maximise blood collection and avoid dilution of blood with wash down water which can cause blood processing problems. Blood is collected and sent for processing at BSM's blood processing plant in the rendering building.

2.4 Wastewater Irrigation

The BSM Site is situated approximately 7km east of the Woodlands Township. Resource Consent AUTH-201191-V1 authorises the discharge of wastewater to land on two properties within close proximity to the BSM Site, being a property owned by BSM and three owned by third parties. The authorised farm parcels adjoin and as such are commonly referred to as a single entity, being the Wastewater Farm.

The location of the discharge area relative to Invercargill City is presented below:

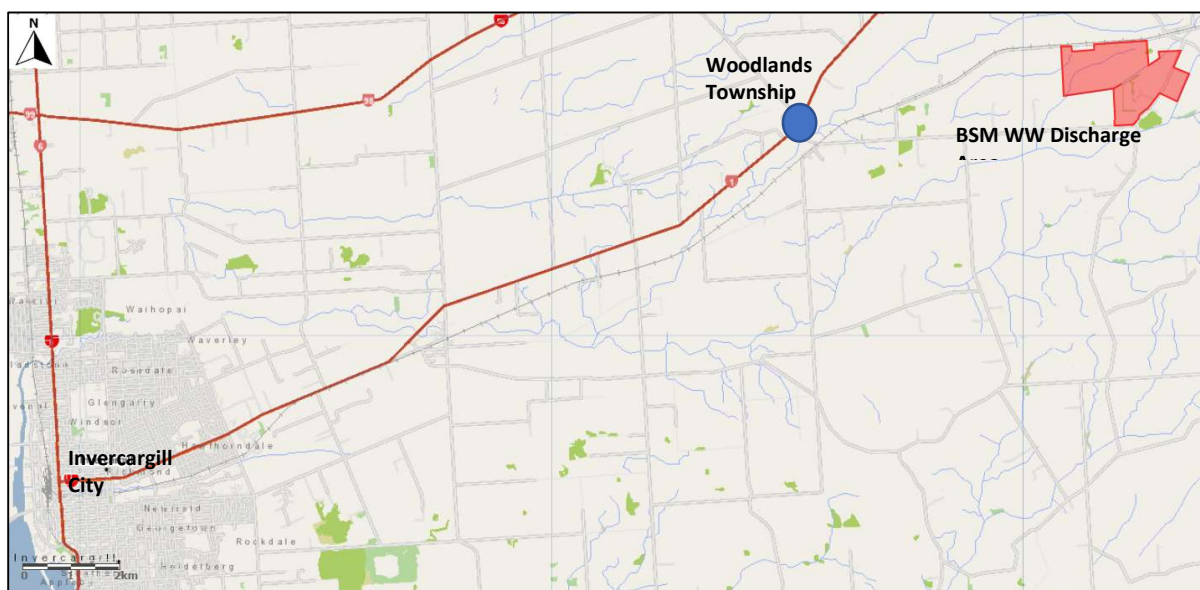


Figure 2: Wastewater Discharge Location

Under normal operating conditions, wastewater is irrigated to land once it has been through primary and secondary treatment. The process flow through the WWTP is:

- Wastewater from the slaughterhouse and rendering plant passes through a 1mm Contra Shear screen unit before entering the Flow Equalisation Basin.
- The Flow Equalisation Basin is hydraulically connected to the Lift Pump Station.
- Wastewater is pumped from the Lift Pump Station to the Anaerobic Lagoon.
- Wastewater then flows on to the SBR Lagoon via an interconnecting gravity pipe.
- Wastewater from the Lift Pump Station is also pumped directly to the SBR during the fill phase.
- The SBR discharges via a decant structure and associated pump to the existing Irrigation Lagoon.
- From the Irrigation Lagoon, wastewater is pumped to land via the irrigation system.

One style of spray irrigation is currently used on the Wastewater Farm, being a low-rate K-Line Pod Irrigation System. The irrigation pods are transportable and are regularly moved in order to complete the required runs per paddock, prior to the pods being moved to the next scheduled paddock. Applications occur at a rate of 6mm/hour over a period of up to five hours, which equates to 30mm per application event, before being moved to the next run. The pod system is capable of pumping approximately 16.5m³/hour.

In order to minimise potential odour emissions and prevent spray drift beyond the property boundary, irrigation does not occur within 20 meters of any property boundary, in accordance with Condition 15 of Consent AUTH-201193-V5.

2.5 Boiler Operations

BSM operates two Vekos Anderson coal-fired boilers which are rated at 2.0 MW and 4.3 MW. The 2.0 MW boiler provides hot water for the processing plant and has a stack height of 18.6 m. The 4.3 MW boiler provides steam for the rendering plant, blood processing and blood drying plants and also has a stack height of 20 m. These boilers operate grit re-firing and are fitted with cyclones to reduce particulate emissions. Coal is currently sourced from the Takitimu mine which provides sub-bituminous coal. It is routinely tested to ensure compliance with discharge limits specified in Consent AUTH-201193-V5.

Air Permit AUTH-201193-V5 places some key conditions on the operation of the two boilers which are presented below in Table 3.

Table 4: Boiler Operations Limits

Condition(s) No.	Parameter	Limit / Requirement
2(f), 3(a)	Coal Burning Rate	4.3 M W boiler: 1,350 kg/hr
2(g), 3(b)		2.0 MW boiler: 630 kg/hr
4	Opacity of Emissions	Ringelmann Shade 1
6	Coal Sulphur	0.5% by weight
6	Coal Ash	7% by weight
6	Fine Particles (< 3.35 mm)	30% by weight
7	Particulate Emissions	500 mg/m ³

The coal burning rates are set by the boiler coal feed screw rates and therefore the coal burning rates are fixed and do not exceed the Air Permit limits specified in Condition 3 of AUTH-201193-V5.

2.6 Rendering

The rendering plant is a Keith 900 series continuous dry rendering plant with a rated throughput of approximately 5,750 kg/hr of raw material, as required by Condition 2 of Consent AUTH201193-V5. The plant is installed in a specially designed building of concrete tilt slab construction. The building is sealed and is ventilated to an odour control biofilter in order to manage odour emissions.

Raw material is collected at various points in the meat processing plant in bins. The bins are transported to the rendering plant building using forklift trucks. A rapid roller door has been installed on the raw material receive area that automatically opens and closes when a forklift is transporting bins of raw material into the building. The raw material is transferred to a raw materials holding bin fitted with mixing screws. The raw material is transferred from the raw materials holding bin using a screw conveyor to a pre-breaker prior to feeding to the rendering cooker.

Cooked material, which consists of meat meal and tallow, is continually discharged from the cooker and separated into the liquid and solid phases using a perforated screen. The solids phase is discharged to two continuous meal presses, the purpose of which is to reduce the tallow concentration with the tallow being recycled back to the cooker. The pressed meal is conveyed to a mill from where it is discharged to a meal holding bin for dispatch. Any dust emissions associated with meal handling are contained within the building.

The rendering cooker is totally enclosed and water, which is removed during the cooking process from the raw materials as water vapour, passes to a water-cooled condenser. Condensate from the condenser, which has a temperature of 40-45°C bypasses the fat trap and discharges to the main plant wastewater stream. The non-condensable gases from the condenser are discharged to the odour control biofilter.

Air Permit AUTH-201193-V5 places some key conditions on the operation of the rendering and Meat Processing Plants which are presented below:

Table 5: Processing Operations Limits

Condition(s) No.	Parameter	Limit / Requirement
10 (a)	Rendering Plant material	Fresh or suitably preserved material only
10 (b)	Rendering Plant material retention on site	Raw material held for no more than 24 hours
10 (c)	Rendering Plant material	Suitable preserved material must be chilled or frozen within 24 hours of slaughter
11	Rendering Plant building air pressure	Negative pressure at all times and discharge via an odour control biofilter
12	Rendering Plant odour control biofilter air changes	At least 12 air changes per hour
13	Processing and Rendering Plant cleaning	Daily

2.7 Blood Processing

Blood is transported from the sticking area at regular intervals in a sealed container using a forklift truck to the blood processing area. The blood is then drained into one of two stirred holding tanks in the blood processing room and the blood is aged overnight. Aging is a process which also improves blood yield. The aged blood is pumped to a steam-heated coagulator and then to a decanter centrifuge to separate the solid and liquid phases. The liquid phase is discharged to the

drain and the solid phase conveyed to a steam-heated disc dryer.

The dried blood is milled prior to bagging and stored in the meal holding area. The water vapour from the blood drier is discharged to the water-cooled condenser.

3 Air Emission Controls and Monitoring

3.1 Primary Discharges to Air Summary

BSM has reviewed all its meat processing operations and identified the key potential emissions to air. The primary potential air emissions are listed in Table 5 along with the corresponding controls:

Table 6: Primary Potential Air Emissions and Controls Summary

Meat Processing Activity	Primary Potential Air Emissions	Control Measures
Stockyards	Odour	Natural ventilation Regular cleaning/hosing
Wastewater collection and treatment	Odour; aerosols	Regular cleaning/hosing Primary treatment including blood and solids removal Limited wastewater retention time Location of activity from boundary Operational constraints as per Resource Consent AUTH-20181937-04
Wastewater irrigation	Odour; aerosols	As above Irrigator placement Refer to BSM Irrigation Management Plan / Wastewater Farm Environmental Management Plan Operational constraints as per Resource Consent AUTH-201191-V1
Boilers	Particulates; sulphur dioxide	Cyclone technology Coal quality Routine monitoring Boiler servicing and maintenance Operational constraints as per Resource Consent AUTH-201193-V5
Rendering	Odour; particulates	Sealed building Odour control Biofilter Regular cleaning Operational constraints as per Resource Consent AUTH-201193-V5
Blood processing	Odour; particulate	As above Sealed transportation vessels

3.2 Stockyards

The effects of stockyard odours are controlled by:

- Regular (usually daily) cleaning by hosing; and
- Cleaning sumps once per year.

3.3 Wastewater Collection and Treatment

The effects of wastewater odours and aerosols are controlled by:

- cleaning and servicing wastewater sumps once per year;
- ensuring wastewater is treated and discharged continuously (when soil conditions are suitable) to minimise the potential for wastewater to become anaerobic;
- covered contrashear to minimise aerosol discharge;
- daily housekeeping and cleaning (hosing) to avoid accumulation of biodegradable material;
- maintaining contrashear self-cleaning jets and waterblasting once per year;
- establishing wastewater collection and treatment facilities well within the property boundary to provide a buffer between the meat processing operations and neighbours; and
- Ensuring that biogases generated from the anaerobic treatment pond are combusted via the flare except for in the event of combustion equipment failure or maintenance or to enable maintenance of the wastewater treatment plant biofilter biogas can be discharged to the wastewater treatment plant biofilter.

It should be noted that in circumstances where the wastewater treatment plant biofilter is used for more than 20 days in any calendar year ending 31 December, BSM must provide ES a report that details the reasons for the use of the biofilter during the year.

3.4 Wastewater Irrigation

The effects of wastewater irrigation odours and aerosols are controlled by:

- minimising odour of the wastewater itself by applying methods described in Section 3.3;
- ensuring no irrigation of wastewater within 20 m of any BSM property boundary;
- ensuring no spray drift beyond BSM's property boundary; and
- considering wind direction and wind strength when siting wastewater irrigator to minimise odour and spray drift effects.

3.5 Boiler Operations

The effects of boiler particulate and sulphur dioxide emissions are controlled by:

- arranging 12 monthly service of each boiler and providing reports to Environment Southland on request;
- tuning the boilers to ensure optimal fuel combustion, minimum fuel use and minimum particulate emissions;
- ensuring the optimal operation of grit arrestor system;
- emptying ash once per week;
- undertaking emission testing of each boiler once per five years to ensure compliance with emission limits specified by Condition 7 of AUTH-201193-V5 (500 mg/m³), and providing a report to Environment Southland with the annual monitoring report for that year;
- minimising energy demand and operating the rendering plant at best practice to minimise boiler demand;
- reviewing monthly Takitimu Mine coal analyses to ensure compliance with sulphur (0.5%), ash (7%) and fine particle composition <3.35mm (<30%) limits and provide results with annual report to Environment Southland;
- discharging emissions via stacks to ensure adequate dispersion;
- setting coal burning rates to ensure compliance with Air Permit limits; and

-
- visually monitoring opacity of emissions to ensure compliance with the limits as specified in Condition 4 of AUTH-201193-V5 (specifically Ringelmann Shade 1).

3.6 Rendering and Blood Drying

The effects of odour and particulate emissions from the rendering and blood drying plant will be controlled by:

- processing fresh material, from onsite only, as soon as practicable;
- conveying rendering raw material from meat processing departments into the rendering building as soon as practicable;
- maintaining a vacuum in the rendering/blood drying building at all times and direct all captured odorous gas to odour control biofilter;
- ensuring 12 changes of rendering building air per hour;
- minimising external door opening times;
- undertaking daily housekeeping and cleaning;
- directing cooking gases to the condenser to remove as much odorous vapour as practicable prior to discharge to the odour control biofilter;
- minimising fugitive dusts by regular cleaning; and
- maintaining sock type air filter on blood mill exhaust.

Another important process aspect is that the odour control biofilter air extraction fan is locked into the rendering process i.e. the rendering process cannot operate without the biofilter extraction fan operating.

3.7 Odour Control Biofilter

All rendering/blood drying building ventilation air and non-condensable gases from the condenser are directed to an odour control biofilter. The specifications of the odour control biofilter have been approved by Environment Southland prior to construction. Construction of the odour control biofilter as specified ensures that key aspects of the odour control capacity of the odour control biofilter are met.

Monitoring ensures that ongoing odour control is achieved, and this includes:

- undertaking daily visual checks of the odour control biofilter to ensure even distribution of the exit gases;
- checking for signs of odour control biofilter bed degradation e.g. slumping; and
- ensuring odour control biofilter bed moisture levels are maintained and applying water to the bed if necessary;

4 Responsibilities

It is the responsibility of the BSM CEO to:

- Ensure compliance with regulatory requirements, including Air Discharge Permit AUTH-201193-V5,
- Manage and oversee capital planning and expenditure processes relating to operations and compliance, along with the Engineering Manager, and
- Authorise CAPEX and OPEX expenditure as well as operational down-time on consideration of data from the Health & Safety and Environmental Manager in the event of a non-compliant air discharge.

It is the responsibility of the Environmental Officer to:

-
- Ensure that resource consents requirements are adhered to, including monitoring and reporting to Environment Southland,
 - Ensure that staff are made aware and understand consent and ADMP requirements where applicable to their roles and responsibilities,
 - Supply data to the BSM CEO and Board for consideration of maintenance, CAPEX and/or ultimately shutdown of equipment in relation to an unauthorised discharge event,
 - Revise the contents of this ADMP annually or as required in accordance with condition 16 of AUTH-201193-V5.

It is the responsibility of the Farm & By Products Manager to:

- Ensure that documented procedures are in place for activities related to the discharge of contaminants to air and specifically those activities detailed in this ADMP,
- Ensure that departmental staff members are aware of the documented procedures,
- Ensure that adequate training is given to all personnel who operate these systems,
- Ensure that offfal pits are suitably managed and monitored, and
- Oversee and manage irrigation and wastewater treatment activities to ensure potential emissions are minimised and prevented.

It is the responsibility of the Plant Manager to:

- Ensure that documented procedures are in place for activities related to the discharge of contaminants to air and specifically those activities detailed in this ADMP,
- Ensure that departmental staff members are aware of the documented procedures,
- Ensure that adequate training is given to all personnel who operate these systems,
- Ensure that the Rendering Plant is operated as a negative air-pressure building with air changes completed as required and emissions expelled via the odour control biofilter.

It is the responsibility of the Chief Engineer to:

- Assist with capital planning and expenditure processes relating to operations and compliance,
- Ensure equipment is maintained and calibrated as required,
- Ensure equipment is serviced at the required frequencies and in particular the boiler and odour control biofilter,
- Ensure that sumps and drains are cleaned out and inspected at the specified frequencies,
- Oversee and manage boiler operations to ensure potential emissions are minimised and prevented,
- Complete visual opacity assessments in order to assess compliance and manage emissions from the coal-fired boilers, and
- Liaise with Newvale Mine in relation to coal quality and compliance.

It is the responsibility of all BSM staff members:

- Ensure housekeeping and cleaning activities relating to their respective roles are completed to minimise potential odour emissions, and
- Adhere and carry out the procedures documented in this ADMP and in the respective Site procedures.

5 Contingency Measures

BSM expects that normal operating procedures will avoid adverse effects of air emissions, particularly odour and particulates, outside the boundary of the defined property. Despite this, on

occasions, circumstances can arise where contingency measures are required. The primary foreseeable occasions are listed in Table 6 along with the appropriate contingency measure.

Table 7: Air Emissions Contingency Measures

Issue		Contingency Measure
1	Wastewater irrigation odour effects	Change location of wastewater irrigator with consideration of wind direction and location of receptors.
2	Boiler malfunction	Preserve rendering raw material and direct to off-site service rendering facility
3	Rendering plant malfunction	Preserve rendering raw material and direct to off-site service rendering facility
4	Offal pit excessive odours	Cover offal and construct new offal pit
5	Biofilter failure	Repair biofilter or preserve raw material and direct to off-site service rendering facility
6	Blood processing	Odour; particulate
7	Offal pits	Odour

6 Odour Complaints

If BSM receives any complaints from neighbours regarding odours or spray drift from its operations, then BSM will initiate an investigation as soon as practicable into the cause of odours and take appropriate measures to ensure that the adverse effects of such odours are avoided. BSM will use the complaint form in Appendix 3 to guide its response and investigation and provide copies of completed forms to ES with the annual BSM Environmental Monitoring Report or on request.

As required by Condition 19 of AUTH-201193-V5, BSM will complete a systematic odour diary programme as directed by the Council with the corresponding reporting and completion of mitigation measures where practicable.

7 Community Liaison

BSM is committed to operating as a responsible member of the community and will continue to operate an "open door" policy and encourage neighbours to contact the plant directly regarding any air emission issues or concerns.

A contact number is provided on the BSM website for the public to contact BSM at any time.

8 Audit and Review

BSM will, once per year, carry out an audit of the requirements of this AMP and the associated requirements of Air Permit AUTH-201193-V5 to ensure that all requirements are being met. This ADMP will be updated once per year, if necessary, and an updated ADMP provided to Environment Southland.

9 Blue Sky Meats Contacts

The **primary** contact in relation to implementing this ADMP is:

Contact Name:	Jacob Read
---------------	------------

Position:	Environmental Officer
Phone:	027 909 8614
Email:	Jacob.read@bluesky.co.nz


Secondary contacts responsible for various aspects of compliance with Air Discharge Permits AUTH-201193-V5 and AUTH-20181937-04 and this ADMP are:

Contact Name:	Jason O'Connell
Position:	Plant Manager
Phone:	027 267 5499
Email:	Jason.connel@blusky.co.nz

Contact Name:	Position vacant
Position:	Chief Engineer
Phone:	N/A
Email:	N/A

Contact Name:	Karl Evans
Position:	Farm & By Products
Phone:	027 351 9438
Email:	karl.evans@bluesky.co.nz

Appendix 1 – Air Discharge Permit: AUTH-201193-V5

 environment SOUTHLAND	AUTH-201193-V5 Cnr North Road and Price Street (Private Bag 90116) Invercargill Telephone (03) 211 5115 Fax No. (03) 211 5252 Southland Freephone No. 0800 76 88 45
<h3>Air Discharge Permit</h3>	
<p>Pursuant to Section 105(1) of the Resource Management Act 1991, a resource consent is hereby granted by the Southland Regional Council to Blue Sky Meats (NZ) Ltd (the “consent holder”) of Morton Mains, R D 1, Invercargill from 23 May 2003.</p>	
<p>Please read this Consent carefully, and ensure that any staff or contractors carrying out activities under this Consent on your behalf are aware of all the conditions of the Consent.</p>	
Details of Permit	
Purpose for which permit is granted:	To discharge contaminants to the air from a meat processing plant, rendering and blood drying plant and associated boilers
Location	- site locality Morton Mains - map reference F46:745:195 - receiving environment Air
Legal description of land at the site:	Lot 1 DP 595 and Pt Lots 7 & 8 DP 159 being Pt Sec 42 Blk VIII Lothian HD; Lots 9, 12 and 13 DP 159 and Lots 292 and 293 DP 155 being Sec 42 Blk VIII Lothian HD; Lot 1 DP 12016 being Pt Sec 12 Blk VIII Lothian HD; Lot 1 DP 8287 and Lot 1 DP 12194
History of Amendments:	Conditions amended on 22 April 2009, 8 June 2015, and 30 March 2016 as follows. Consent varied on 22 November 2018. Conditions amended on 28 February 2019
Expiry date:	31 December 2022
<small>Environment Southland is the brand name of the Southland Regional Council</small>	

Schedule of Conditions

General

1. This resource consent shall expire on 31 December 2022.
2. This consent allows the discharge of contaminants from the applicant's industrial premises at Morton Mains from the following sources, as described in the original application; the variation application dated 5 March 2015 and further information dated 14 May 2015 and 27 May 2015, and the application for variation to the refrigerant system dated 13 December 2018, subject to the conditions set out in this document:
 - (a) A rendering plant processing up to 5,750 kg of raw material per hour;
 - (b) A blood processing and drying operation;
 - (c) A meat processing plant;
 - (d) Collection and treatment of wastewater from rendering and meat processing, until the date that the wastewater treatment system described in the 13 December 2018 application is commissioned;
 - (e) Irrigation onto land of up to 1000 cubic metres per day of wastewater;
 - (f) One 4.3 MW coal-fired boiler;
 - (g) One 2 MW coal-fired boiler;
 - (h) Offal pits;
 - (i) Salting shed

Boilers

3.
 - (a) The maximum coal burning rate in the 4.3MW boiler shall not exceed 1350 kilograms of coal per hour.
 - (b) The maximum coal burning rate in the 2MW boiler shall not exceed 630 kilograms of coal per hour.
4. The opacity of emissions from the chimney stacks of the coal-fired boilers shall not be darker than Ringelmann Shade 1 as described in New Zealand Standard 5201:1973 except:
 - (a) in the case of a cold start, for a period not exceeding 30 minutes in the first hour of operation; and
 - (b) for a period not exceeding a total of four minutes in each succeeding hour of operation.
5.
 - (a) The discharge into air from the 4.3MW boiler shall occur via a stack at a height of at least 20 metres above ground level and at least 9 metres above the roof ridgeline of any adjacent building.
 - (b) The discharge into air from the 2MW boiler shall occur via a stack at a height of at least 19 metres above ground level and at least 10 metres above the roof ridgeline of any adjacent building.

- (c) The discharges shall be directed vertically into air and shall not be impeded by any obstruction above the stack which decreases the vertical efflux velocity.
6. The sulphur content of a representative sample of the coal burned shall not exceed 0.5 percent by weight. The ash content of that sample shall be less than 7 percent by weight. The sample shall contain less than 30 percent by weight of fine particles having a diameter of less than 3.35 millimetres.
7. (a) The concentration of particulate matter in combustion gas discharged from the coal-fired boiler chimney stacks shall not exceed 500 milligrams per cubic metre adjusted to 0 degrees Celsius, dry gas basis, 101.3 kilopascals, and 8 percent oxygen or 12 percent carbon dioxide.
- (b) Any measurement to confirm compliance with the particulate concentration limit shall occur when the tested boiler is operating at greater than 75 percent of the maximum continuous rating. The method of sampling and analysis shall comply with ISO 9096:1992(E), and may include methods BS 6069: 1992, ASTM D3685-78, ASTM D3685M-92, AS 4323.2-1995, US EPA Method 5, US EPA Method 17 or an equivalent method that complies with the fundamental sampling requirements of ISO 9096:1992(E).
8. The boiler stacks shall be fitted with source emission test ports and safe access for testing, to the satisfaction of Environment Southland.
9. The coal-fired boilers shall be serviced and maintained to ensure compliance with Conditions 4 and 7(a) at all times. Service reports shall be prepared and retained, and copies shall be provided to Environment Southland on request.

Rendering and Meat Processing

10. (a) Only fresh raw material or suitably preserved material shall be processed in the rendering plant.
- (b) Raw material for rendering shall not be held on-site for more than 24 hours.
- (c) Suitably preserved material shall be material that is chilled or frozen and is derived from cutting, boning or further processing of animal tissue that has been chilled or frozen within 24 hours of the time of slaughter.
11. The air within the rendering plant building shall be maintained at negative pressure at all times during processing such that all ventilation air is discharged via a biofilter, as described in the application.
12. The rendering plant biofilter shall be capable of treating at least 12 air changes per hour and shall contain filter media to a depth of at least 1 metre. Design plans of the biofilter shall be provided to Environment Southland for approval, prior to construction.

13. Processing areas, collection sumps and traps in the meat processing plant and rendering plant shall be cleaned at least daily to minimise odour emissions.

Wastewater Treatment and Irrigation

14. (a) Wastewater shall be maintained in an aerobic condition using two Apex 45 aerators in order to minimise odour, as described in the application to vary the consent lodged on 1 March 2016. Wastewater shall not be held in the storage pond for a continuous period of more than 2 days unless aerated to avoid the onset of anaerobic conditions.
- (b) The consent holder shall notify the consent authority in writing (email: escompliance@es.govt.nz) upon commission of the wastewater treatment system described in the resource consent application dated 13 December 2018
- (c) Condition 14(a) shall cease to have effect from the date that the wastewater treatment system is commissioned, and after that date the emissions from the treatment and storage of wastewater on the site shall be authorised under Resource Consent AUTH-20181937-04, or other rule or resource consent.
15. Wastewater shall not be irrigated onto land within 20 metres of any property boundary. There shall be no spray drift beyond that property boundary.

Site Management Plan

16. Management Plan:
- (a) By the 31st of December 2015, an updated site management plan shall be prepared and provided to the Consent Authority for approval. This management plan shall detail all actions to be taken to minimise odour and particulate matter emissions from the plant and to ensure compliance with the conditions of this consent. The plan shall address:
- (i) Wastewater collection and treatment, including maximum holding times;
 - (ii) Wastewater irrigation procedures and minimum setback distances; and
 - (iii) Boiler plant maintenance.
- (b) Within three months of commissioning of the rendering plant, an update of the plan shall be submitted to the Council's Manager of Environmental Compliance. The update shall include the above matters and the following:
- (i) Biofilter maintenance requirements;
 - (ii) Operating procedures to minimise odour emissions from the rendering and blood-drying plant.
- (c) The management plan shall state the name and contact telephone number of all persons responsible for each action described in the plan and shall be updated at

least annually to include staff changes. The plan shall be available for inspection at the consent holder's property at all times.

Odour Conditions

17. The discharges shall not cause odour that is offensive or objectionable to such an extent that it has an adverse effect on the environment beyond the boundary of the property on which the consent is exercised.
18. A record of any complaints relating to odour shall be kept, and shall include:
 - (a) the location where the effect was detected by the complainant;
 - (b) the date and time when the effect was detected;
 - (c) a description of the wind speed and wind direction when the effect was detected by the complainant;
 - (d) the most likely cause of the effect detected; and
 - (e) any corrective action undertaken by the consent holder to avoid, remedy or mitigate the effect detected by the complainant.

This record shall be provided to Environment Southland annually and otherwise on request.

19. Should, in the opinion of the Council's Manager of Environmental Compliance, odour complaint records indicate that discharges from the consent holder's activities are causing odour nuisance, the consent holder shall instigate a systematic odour diary programme during the subsequent year to establish the characteristics of odour impacts caused by the discharges. The design of the odour diary programme shall be in accordance with recognised good practice and shall be to the satisfaction of Environment Southland. Results of the odour diary programme shall be reported to Environment Southland within two months of completion of the programme. The report shall include an assessment of the need for mitigation of any adverse effects identified.

Administration Conditions

20. The consent holder shall pay an annual administration charge to the Southland Regional Council, collected in accordance with Section 36 of the Resource Management Act, payable in advance on the first day of July each year. The charge shall include the cost of two inspections of the effluent discharge area by Council officers each year.
21. The Southland Regional Council may serve notice, as a result of information received, in accordance with the conditions of this permit, and in accordance with Sections 128 and 129 of the Act, in the period May to September each year, of its intention to review the conditions of the consent for the purposes of:
 - (i) dealing with any adverse or cumulative effects on the environment which may arise from the exercise of this consent;

- (ii) addressing monitoring requirements; or
- (iii) complying with the requirements of a regional plan.

22. The consent holder may apply to the Council for the change or cancellation of any of the conditions of this consent, other than Condition 1, in accordance with Section 127 of the Resource Management Act, during the period May to September each year.


Reissued 28 February 2019 after changes to Condition 2

for the **Southland Regional Council**



Aurora Grant
Consents Manager

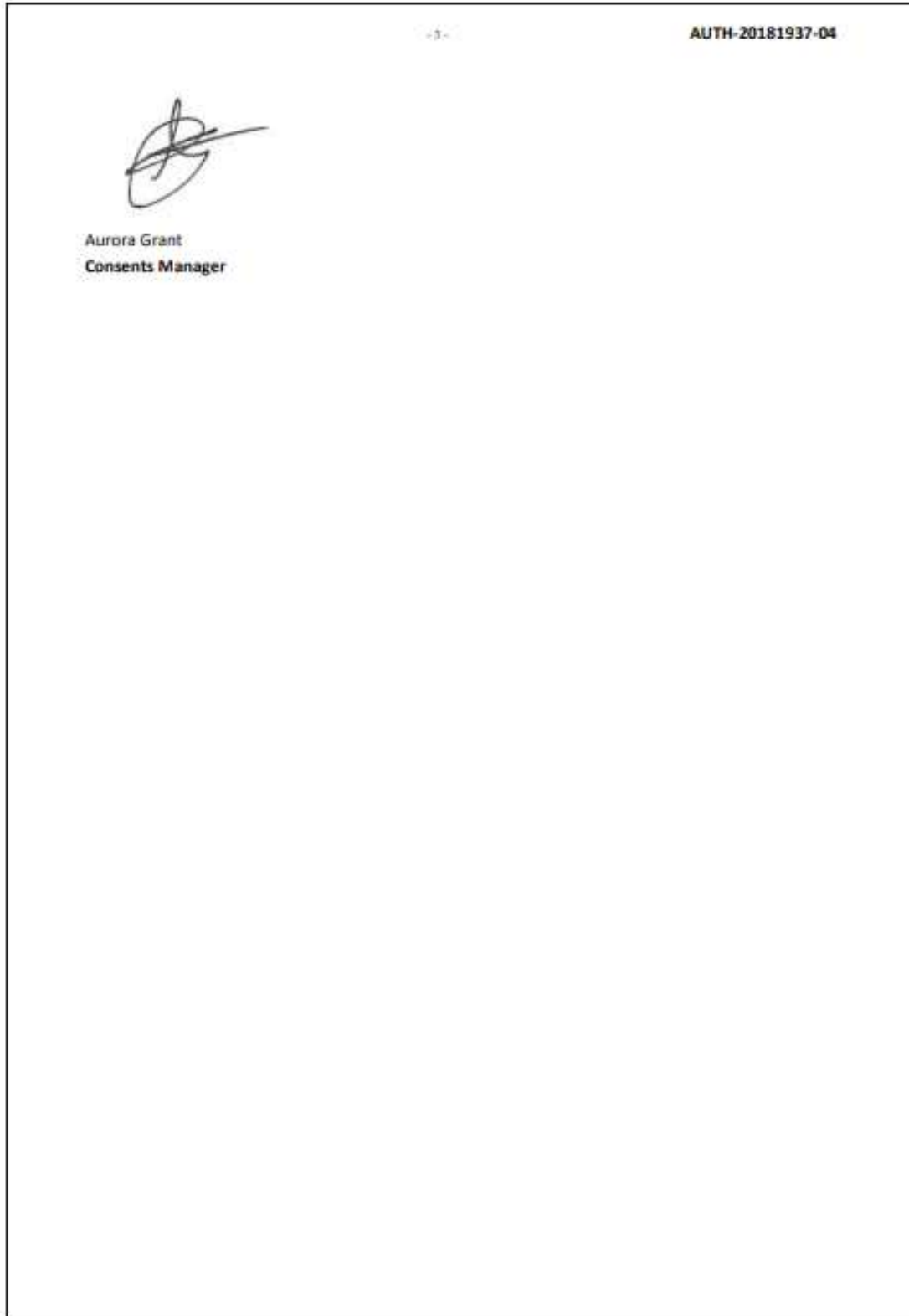
Appendix 2 – Air Discharge Permit: AUTH-20181937-04

 <p>environment SOUTHLAND REGIONAL COUNCIL Te Taiao Tonga</p>	<p>AUTH-20181937-04</p> <p>Cnr North Road and Price Street (Private Bag 90116 DX YX20175) Invercargill</p> <p>Telephone (03) 211 5115 Fax No. (03) 211 5252 Southland Freephone No. 0800 76 88 45</p>
<h3>Discharge Permit</h3>	
<p>Pursuant to Section 104B of the Resource Management Act 1991, a resource consent is hereby granted by the Southland Regional Council to Blue Sky Meats (NZ) Ltd of 729 Woodlands Morton Mains Road, RD 1, Morton Mains, Invercargill 9871 from 28 February 2019.</p>	
<p>Please read this Consent carefully, and ensure that any staff or contractors carrying out activities under this Consent on your behalf are aware of all the conditions of the Consent.</p>	
<h4>Details of Permit</h4>	
Purpose for which permit is granted:	To discharge contaminants to air from a wastewater treatment system
Location	- site locality 729 Woodlands Morton Mains Road, Morton Mains - map co-ordinates NZTM2000 1,264,980E 4,857,710N - airshed Southland
Legal description of land at the site:	Lot 1 DP 595
Expiry date:	31 December 2022
<h4>Schedule of Conditions</h4>	
<h5>General conditions</h5>	
<ol style="list-style-type: none">1. This resource consent authorises the emission of contaminants to air from a wastewater treatment process, as described in the resource consent application dated 13 December 2018 (ES Objective references A442772 & A442771).2. The discharge shall not cause odour or spray drift that is offensive or objectionable to such an extent that it has an adverse effect on the environment beyond the boundary of Lot 1 DP 595.3. The Consent Holder shall ensure that biogases generated from any anaerobic treatment facility are combusted via a flare or an energy recovery system at all times except under the following circumstances:<ol style="list-style-type: none">a. in the event of a combustion equipment failure; orb. for combustion equipment maintenance purposes; or	
<small>Environment Southland is the brand name of the Southland Regional Council</small>	

- c. for periodic venting of biogases via the flare blower as part of the routine maintenance programme; or
 - d. during commissioning of the new anaerobic treatment facility when a continuous discharge to the biofilter, may be required until such time as the thermal destruction is self sustaining; or
 - e. for purposes of supplying a continuous supply of small amounts of biogases from the covered anaerobic treatment facility to enable maintenance of the biofilter.
4. Under the circumstances where biogases are not flared and/or utilised for energy recovery then biogases shall be vented to the contingency biofilter. If use of the biofilter is required for more than 20 days in any calendar year ended 31 December, the Consent Holder shall within 60 days provide Environment Southland with a report which details the reason for the use of the biofilter during the year.
5. The consent holder shall maintain a diary of odour and spray drift complaints.
- a. The diary shall record:
 - the effect observed by the complainant;
 - the date and time of each complaint;
 - weather conditions (such as wind direction, approximate wind speed, temperature);
 - location of the complaint;
 - nature and intensity of the odour or spray drift; and
 - the action taken in response to the complaint.

(Note: This condition does not require the consent holder to take action over every complaint but it does require that that decision be recorded.)
 - b. The consent holder shall provide a record of the complaints diary to the Southland Regional Council on request
6. The consent holder shall maintain an after-hours contact number for the receipt of complaints and concerns about dust emissions. This contact number shall be listed on the consent holder's website (<https://bluesky.co.nz>).
7. The Consent Authority may, in accordance with Sections 128 and 129 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions of this consent during the period 1 February to 30 September each year, or within two months of any enforcement action being taken by the Consent Authority in relation to the exercise of this consent, for the purposes of:
- a. Determining whether the conditions of this permit are adequate to deal with any adverse effect on the environment, including cumulative effects, which may arise from the exercise of the permit, and which it is appropriate to deal with at a later stage, or which become evident after the date of commencement of the permit;
 - b. Ensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and/or the Environment Southland Regional Policy Statement;
 - c. Amending the monitoring programme to be undertaken;
 - d. Adding or adjusting compliance limits;
 - e. Requiring the Consent Holder to adopt the best practicable option to remove or reduce any adverse effect on the environment arising as a result of the exercise of this permit.

for the **Southland Regional Council**



- 4 -

AUTH-20181937-04

Notes:

1. *The Consent Holder shall pay an annual administration and monitoring charge to the Consent Authority, collected in accordance with Section 36 of the Resource Management Act, 1991, payable in advance on 1 July each year.*
2. *In accordance with Section 125(1)(a) of the Resource Management Act, this consent will lapse after a period of five years after the date of commencement unless it is given effect to or an application is made to extend the lapse period before the consent lapses.*
3. *In accordance with section 126 of the Resource Management Act, 1991, this consent may be cancelled by the Consent Authority if not exercised for a continuous period of 2 years or more.*
4. *The Consent Holder is reminded that they may apply at any time under Section 127 of the Act to have any condition of this consent changed except that which specifies the expiry date of this consent.*
5. *If you require a replacement permit upon the expiry date of this permit, any new application should be lodged at least 6 months prior to the expiry date of this permit. Applying at least 6 months before the expiry date may enable you to continue to exercise this permit until a decision is made, and any appeals are resolved, on the replacement application.*

Appendix 3 – Odour Complaint Form

Date of Complaint:	
Time of Complaint:	
Location of Complaint:	
Complainant's Name:	
Complainant's Address:	
Complainant's Telephone Numbers:	
Nature of Complaint (frequency, intensity, duration and offensiveness of odour):	
Wind Speed:	Wind Direction:
Weather Conditions:	
Cause of Odour Complaint:	
Corrective Action:	
Feedback to Complainant:	
Form provided to:	
Plant Manager:	Environment Southland:
Signed:	
Date:	

Appendix 4 – Amendment Register

Version	Issue Date	Section	Amendment Description
1	2 December 2015	All	Management Plan developed.
2	14 April 2021	All	Full Plan review. Requirements of AUTH-201193-V3 incorporated into Plan.
3	5 May 2022	All	Full Plan review. Requirements of AUTH-201193-V5 incorporated into Plan.
4	31 July 2023	All	Full Plan review. Requirements of AUTH-20181937-04 incorporated into Plan.



APPENDIX G

Blue Sky Meats Wastewater Farm
Environmental Management Plan

BLUE SKY MEATS LTD

**WASTEWATER FARM
ENVIRONMENTAL MANAGEMENT
PLAN**

July 2023

TABLE OF CONTENTS

1.	Document Control	1
1.1	Document Control Procedures	1
1.2	Amendment Register	1
1.3	Distribution List	1
2.	Introduction	2
2.1	Site Overview	2
2.2	Wastewater Farm Environmental Management Plan Overview	2
2.3	Wastewater Farm Environmental Management Plan Scope	3
2.4	Reference Documents	4
3.	Resource Consents Overview	5
4.	Wastewater System Overview	6
4.1	Source and Volumes	6
4.2	Wastewater Treatment Summary	6
4.3	Disposal Operation	8
5.	Wastewater Farm	12
5.1	Wastewater Farm Overview	12
5.2	Environmental Setting	12
5.3	Environmental Risk Factors	14
5.4	Environmental Risk Mitigations and Programmes	16
5.5	Wastewater Farm Operations Overview	20
6	Monitoring and Reporting	23
6.1	Wastewater Volume Monitoring	23
6.2	Wastewater Composition Monitoring	26
6.3	Nitrogen Loadings	28
6.4	Surface Water Monitoring	28
6.5	Inline Conductivity Metering	29
6.6	Soil Monitoring	29
6.7	Soil Moisture Monitoring	30
6.8	Groundwater Monitoring	31
6.9	Compliance Reporting	32
7	Responsibilities and Communication	35
7.1	Responsibilities	35
7.2	Communication Structures	36
7.3	Contact Details	38
8	Contingency Plans	39
8.1	Odour, Spray Drift, Runoff and Ponding Management	39
8.2	Equipment/Pipeline Failure Management	42
8.3	Non-Compliance Management	42
8.4	Complaint Management	43

9	Maintenance Plans	44
9.1	Maintenance Requirements	44

LIST OF FIGURES

Figure 1:	Wastewater treatment plant	8
Figure 2:	Wastewater discharge area location	9
Figure 3:	Wastewater farm map	12
Figure 4:	Wastewater irrigation areas, soil types and soil monitoring locations	13
Figure 5:	Bore sampling locations	14
Figure 6:	Irrigator screenshot showing irrigation status overview	23
Figure 7:	Irrigator screenshot showing the irrigation status of a paddock when commencing irrigation	24
Figure 8:	Irrigator screenshot showing that the wastewater irrigation limits are being approached	25
Figure 9:	Irrigator screenshot showing paddock that has exceeded the irrigation depth limit	26
Figure 10:	Monthly sampling locations	27
Figure 11:	Groundwater monitoring locations	32

LIST OF TABLES

Table 1:	BSM resource consents (Morton Mains Site)	5
Table 2:	Wastewater farm environmental risk factors overview	15
Table 3:	Farm management environmental risks and mitigations	16
Table 4:	Improvement programme summary	19
Table 5:	Environmental and operational responsibilities summary	35
Table 6:	Communication responsibilities summary	37
Table 7:	Key contacts details	38

LIST OF APPENDICES

Appendix 1 – Resource Consent AUTH-201191-V1

Appendix 2 – Resource Consent AUTH-201193-V5

Appendix 3 – BSM0-03: Reporting Lines

Appendix 4 – BSM006: Incident Investigation Form

Appendix 5 – BSM009: Complaints Register

Appendix 6 – BSM013: Traffic Light Map

Appendix 7 – BSM015: Incident Response Wall Chart

Appendix 8 – BSM017: Application Timing

Appendix 9 – BSM018: Personal Training Record

Appendix 10 - Riparian Planting Plan

1. DOCUMENT CONTROL

1.1 DOCUMENT CONTROL PROCEDURES

This Management Plan should be reviewed annually or on an as-needed basis based on operational changes, stakeholder feedback and compliance management improvements.

1.2 AMENDMENT REGISTER

Version	Date Reviewed	Purpose / Amendments	Section Reviewed	Reviewer
1	October 2022	Development of Wastewater Farm Environmental Management Plan	All	- Environmental Officer - General Manager
2	July 2023	Updated to: <ul style="list-style-type: none">- remove out of date information;- add new wastewater irrigation management system details;- update mapping;- update environmental programme actions; and- update personnel.	All	- Environmental Officer - Mitchell Daysh

1.3 DISTRIBUTION LIST

A current copy of this Wastewater Farm Environmental Management Plan (“**WFEMP**”) is held on the Blue Sky Meats (“**BSM**”) Server computer network.

The following controlled copies of this Management Plan have been issued. The By-Products & Effluent Farms Manager is responsible for ensuring updates are provided to the following holders whenever alterations are made to it:

- Southland Regional Council (Environment Southland)
- Wastewater Treatment Plant Control Room and Operators

Note: Resource Consent AUTH-201191 -V1 Condition 18 requires that any revisions to the Management Plan during the term of this consent shall be forwarded to the Council’s Environmental Compliance Manager before any changes are implemented.

2. INTRODUCTION

2.1 SITE OVERVIEW

Blue Sky Meats (NZ) Limited (BSM) operate a meat processing plant at Morton Mains in Southland (the Site), providing employment to over 350 staff across Southland and Auckland. Operations started in 1987 on the present site, with current processing capacity able to process up to 30,000 animals per week, based on a 20 hours per day, 6 day per week operation at peak season. However, at present, the site is processing up to 27,750 animals per week.

Operations on site include Slaughter and Boning, Skin Salting and Rendering, providing a range of specialist cuts primarily for export. Key activities are:

- Stockyards;
- Slaughter;
- Boning;
- Chilled and frozen storage;
- Skin Salting;
- Rendering, blood drying and associated biofilter odour control;
- Coal-fired boilers;
- Engineering workshop;
- Water abstraction, treatment and storage;
- Wastewater collection and treatment, including a biological treatment plant; and
- Wastewater irrigation to land.

BSM hold various resource consents from the Southland Regional Council (ES) and Southland District Council (SDC) to authorise activities associated with the Site, including their take of groundwater, discharges to land and air, and various land use activities.

2.2 WASTEWATER FARM ENVIRONMENTAL MANAGEMENT PLAN OVERVIEW

The purpose of this Wastewater Farm Environmental Management Plan (WFEMP) is fourfold:

- 1) To fulfil the requirements of Resource Consent AUTH-201191-V1 Condition 18 which requires:

The consent holder shall prepare an irrigation management plan that details the procedures to be put in place to irrigate wastewater in compliance with the conditions of

this resource consent to minimise the potential for adverse effects due to the discharge. A copy of the plan shall be submitted to the Council's Environmental Compliance Manager by 31 August 2003 and any revisions to the plan during the term of this consent shall be forwarded to the manager before any changes are implemented.

- 2) To provide a reference document for BSM staff which details operational procedures and requirements to ensure compliance with resource consents is maintained, and
- 3) To document the environmental landscape associated with the wastewater discharge application area and corresponding farm parcels. The WFEMP provides information on how the wastewater discharge activity should be managed to minimise the potential for adverse environmental effects, to provide information on how sensitive areas should be managed to minimise potential environmental impacts, and to provide detail on implemented mitigation strategies; and
- 4) To provide a summary of actions and programmes of work to facilitate continuous improvement with regard to minimising BSM's environmental footprint.

Note: This WFEMP is not intended to satisfy the requirements of proposed Southland Water and Land Plan but rather is intended as an internal document for BSM. The scope of the Management Plan does not encompass the completion and inclusion of an Overseer Budget.

This WFEMP supersedes the BSM22 Wastewater Irrigation Management Plan.

2.3 WASTEWATER FARM ENVIRONMENTAL MANAGEMENT PLAN SCOPE

The scope of this WFEMP applies to the areas and farm parcels that receive wastewater applications and/or are consented to receive wastewater application from the BSM Morton Mains Site. The scope extends to all activities which occur on those properties, including but not limited to wastewater applications and the overlaying farming operations.

With respect to Resource Consents held by BSM, the following are directly applicable to this WFEMP:

- AUTH-201191-V1 To discharge up to 1000 cubic metres of meat processing and rendering plant wastewater to land at Morton Mains via a spray irrigator; and
- AUTH-201193-V5 To discharge contaminants to the air from a meat processing plant, rendering and blood drying plant and associated boilers at Morton Mains.

Note: BSM hold a separate Wastewater Treatment Plant Operation and Maintenance Manual relating to the operation of the site's WWTP. As such, this detail is not duplicated in this WFEMP but rather this WFEMP refers to the Wastewater Treatment Plant Operation and Maintenance Manual directly where relevant.

It should also be noted that Resource Consent AUTH-20181937 requires that discharges to air from the wastewater treatment system. Odour management for the WWTP is detailed in the Air Discharge Management Plan for the site.

2.4 REFERENCE DOCUMENTS

BSM maintains an operational framework which includes a number of documents and procedures. In relation to wastewater operations and farm management, the following documents provide operational information:

- BSM - Air Discharge Management Plan;
- Standard Operating Procedures; and
- BSM - Wastewater Treatment Plant Operation and Maintenance Manual (PDP).

3. RESOURCE CONSENTS OVERVIEW

BSM hold various resource consents from the Southland Regional Council (ES) and Southland District Council (SDC) to authorise activities associated with the Site, including the take of groundwater, discharges to land and air, and various land use activities. Table 1 provides a summary of the Resource Consents currently held by BSM.

Table 1: BSM resource consents (Morton Mains Site)

Consent Number	Permit Type	Activity	Granted	Expiry
201190	Water Permit	To take and use 1,000,000 l/day of groundwater for a meat processing plant and a rendering and blood drying plant at Morton Mains	3 Dec. 2002	31 Dec. 2022
AUTH-201191-V1	Discharge Permit	To discharge up to 1000 cubic metres of meat processing and rendering plant wastewater to land at Morton Mains via a spray irrigator	23 May 2003	31 Dec. 2022
AUTH-201193-V5	Air Discharge Permit	To discharge contaminants to the air from a meat processing plant, rendering and blood drying plant and associated boilers at Morton Mains	23 May 2003	31 Dec. 2022
AUTH-20181937-01	Land Use	To use land for the construction, maintenance and use of two new non-agricultural effluent storage facilities and ancillary structures and the reconstruction of a non-agricultural effluent storage facility at Morton Mains	28 Feb. 2019	31 Dec. 2022
AUTH-20181937-02	Water Permit	To take and use 302,400 l/day of groundwater for the purpose of dewatering at 729 Woodlands Morton Mains Road, Morton Mains	28 Feb. 2019	31 Dec. 2022
AUTH-20181937-03	Discharge Permit	To discharge stormwater and dewatering water to an artificial water body at Morton Mains	28 Feb. 2019	31 Dec. 2022
AUTH-20181937-05	Air Discharge Permit	To discharge contaminants to the air from a meat processing plant, rendering and blood drying plant and associated boilers at Morton Mains	28 Feb. 2019	31 Dec. 2022
AUTH-20202379	Land Use	To install seven bores for the purpose of monitoring at 729 Woodlands Morton Mains Road & 638 Railway Road, Morton Mains	8 Sept. 2020	1 Oct. 2023

4. WASTEWATER SYSTEM OVERVIEW

4.1 SOURCE AND VOLUMES

The processing of meat and meat by-products requires water for processing and cleaning activities to enable BSM to satisfy food safety and hygiene requirements. Consequently, the processing operations at the Morton Mains plant generates wastewater requiring treatment and subsequent disposal. The ability to discharge treated wastewater to land is therefore a critical to the functionality of the BSM processing plant.

Resource Consent AUTH-201191-V1 allows for the discharge of up to 1,000m³ of wastewater to land per day. Actual volumes generated on a daily basis depend on processing activities, plant and silo cleaning requirements, and operational factors associated with the site's wastewater treatment plant. Resource Consent AUTH-201193-V5 provides for various discharges to air, including those associated with the site's wastewater treatment processes and the discharge of 1,000m³ of wastewater to land.

4.2 WASTEWATER TREATMENT SUMMARY

The BSM Wastewater Treatment Plant (WWTP) can effectively treat up to 1,500m³ of wastewater per day. This is achieved via primary and secondary treatment, following which wastewater is irrigated onto land.

4.2.1 Wastewater Collection and Primary Treatment

Wastewater from the processing plant is currently collected in a number of sumps and pumped to a 1mm Contra Shear screen where gross solids are removed prior to being discharged to a balancing pond called the flow equalisation basin. Wastewater from the stock holding yards is discharged to a separate screen prior to being pumped to the contra shear screen. Wash water from the stock truck unloading areas and other stock holding areas is segregated and discharged to the wastewater system.

The wastewater storage facilities are operated at low levels to provide buffer storage in the event of adverse weather conditions thus minimising environmental effects by matching wastewater application to more suitable soil conditions. Wastewater is also accumulated in the storage facilities in the event of equipment failure and whilst irrigator locations are being changed. The irrigation pond is also equipped with an aeration system to prevent anoxic or anaerobic conditions in the pond so as to avoid the risk of objectionable odours from the pond itself as well as during the subsequent discharge of wastewater to land.

Note: The treatment and disposal of sanitary effluent (i.e., domestic sewage) from the Site is undertaken separately from the wastewater treatment and discharge associated with processing

activities. As such, the discharge of sanitary effluent does not form part of the activities detailed in this WFEMP.

4.2.2 Wastewater Secondary Treatment

The purpose of secondary treatment (biological treatment) is to remove organics, nitrogen and phosphorus¹ from the wastewater prior to it being discharged to land.

Under normal operating conditions, wastewater is irrigated to land once it has been through primary and secondary treatment. The process flow through the WWTP is:

- Wastewater from the slaughterhouse and rendering plant passes through a 1mm contra shear screen unit before entering the flow equalisation basin;
- The flow equalisation basin is hydraulically connected to the lift pump station;
- Wastewater is pumped from the lift pump station to the anaerobic lagoon;
- Wastewater then flows on to the SBR lagoon via an interconnecting gravity pipe;
- Wastewater from the lift pump station is also pumped directly to the SBR during the fill phase;
- The SBR discharges via a decant structure and associated pump to the existing irrigation lagoon; and
- From the irrigation lagoon, wastewater is pumped to land via the irrigation system.

¹ It should be noted that phosphorus is retained within the wastewater solids (also referred to as biosolids) which are discharged to the wastewater farm.

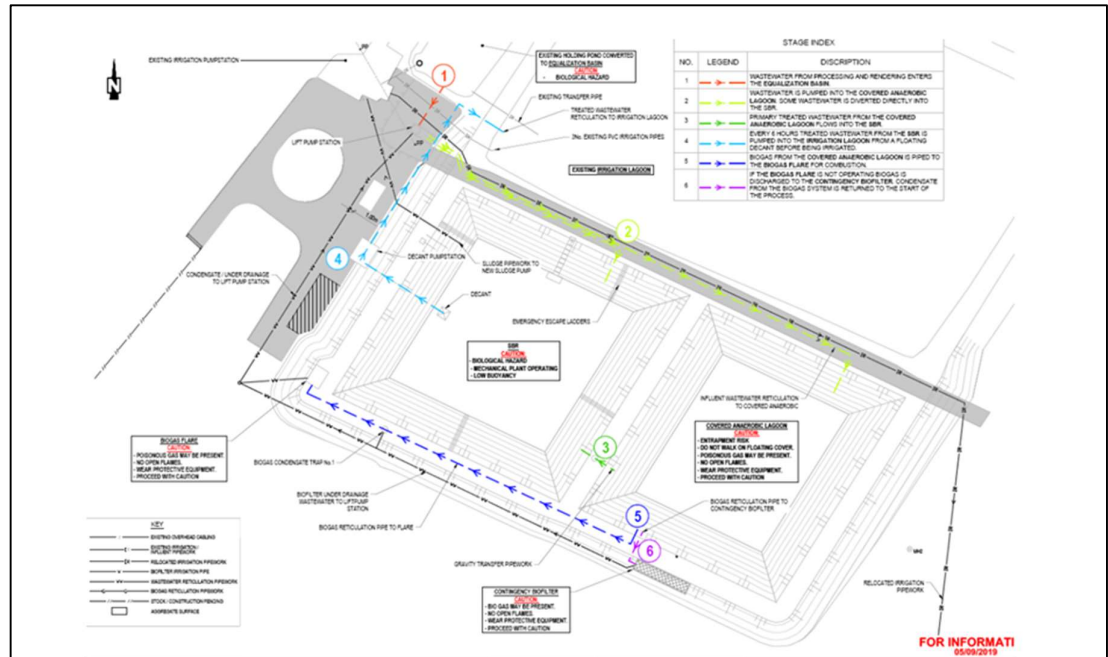


Figure 1: Wastewater treatment plant

Note: Refer to the BSM – Wastewater Treatment Plant Operation and Maintenance Manual (PDP) for a full description of the WWTP functionality, processes, operational procedures and maintenance requirements.

4.3 DISPOSAL OPERATION

4.3.1 AUTH-201191-V1 Disposal Location Overview

The BSM Site is situated approximately 7km east of the Woodlands Township. Resource Consent AUTH-201191-V1 authorises the discharge of wastewater to land on four properties within close proximity to the BSM Site, one of the properties is owned by BSM and comprises:

- Lot 1 DP 14802 (formerly Pt Lot 1 DP 12016);
- Part Lot 7 DP 159;
- Part Lot 8 DP 159; and
- Lot 1 DP 595.

The other three properties belong to:

- Leonard Donald Ward and Deveron Trustees Limited - owner Lot 9 DP 159, Lot 12 DP 159, Lot 13 DP 159, Lot 292 DP 155 and Lot 293 DP 155;

- David Alan Burnett, Graham Colin Ward, Leonard Donald Ward, Paula Jane Ward and Deveron Trustees Limited – owner Lot 1 DP 12194; and
- Graham Colin Ward and Vicki Maree Ward – owner Lot 1 DP 8287.

The location of the discharge area relative to Invercargill City is presented below:

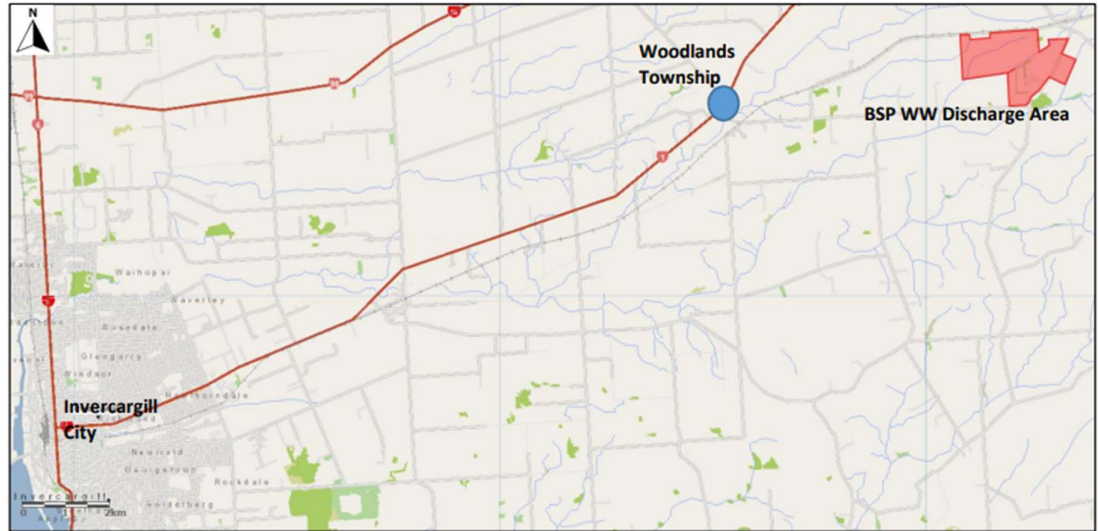


Figure 2: Wastewater discharge area location

4.3.2 Wastewater Discharge Methods

Wastewater is transferred to and across the irrigation area via pumps and sub-surface transfer pipelines. Hydrants are located at various locations across the application area and provide connections between the irrigators and the transfer pipelines. Typically lay-flay hose is utilised to connect the irrigator to the hydrant.

Each paddock within the irrigation area is demarcated and used to record application information specific to that paddock area. Due to style of spray irrigation infrastructure used on wastewater farm, multiple irrigation “runs” occur within each paddock to ensure that the full available paddock area receives wastewater during an irrigation event.

Each of the irrigation supply pumps is fitted with high- and low-pressure cut-outs and GPS systems. The low-pressure cut-out stops the pump in the event of a burst irrigation hose or pipe and the high-pressure cut-out in the event of a blockage.

One style of spray irrigation is currently used on the wastewater farm, being a low-rate K-Line Pod Irrigation System. The irrigation pods are transportable and are regularly moved in order to complete the required runs per paddock, prior to the pods being moved to the next scheduled

paddock. Applications occur at a rate of 6mm/hour over a period of up to five hours, which equates to 30mm per application event, before being moved to the next run. The pod system is capable of pumping approximately 16.5m³/hour.

4.3.3 Wastewater Application Controls

As per the requirements of Resource Consent AUTH-201191-V1:

- Applications may only occur on those properties authorised by the Consent (Condition 2, Schedule 1),
- The maximum rate of discharge shall not exceed 1,000 m³/day (Condition 3),
- No discharge shall occur onto:
 - (i) Dacre Silt Loam or Otikerama Silt Loam soils;
 - (ii) Waikiwi mottled soil during the period 1 May to 30 September; and
 - (iii) Waikiwi mottled soil when the soil is wetter than field capacity (Condition 4(d)).
- The depth of wastewater application onto any area of land shall not exceed:
 - (i) 30 mm, as an average of each application during the period 1 July to 30 June each year; and
 - (ii) 35 mm for any individual application (Condition 5).
- Applications must have a minimum return period of 14 days between applications of wastewater onto the same area of land (Condition 6);
- The annual nitrogen loading rate from irrigation of wastewater and fertilisers applications shall not exceed:
 - (a) 450 kg/ha averaged over irrigation areas predominantly utilising cut and carry of vegetation; and
 - (b) 350 kg/ha, averaged over all other irrigation areas (Condition 7),
- Treated wastewater discharge shall not occur within;
 - (a) 20 metres of any surface watercourse;
 - (b) 20 metres of any property boundary;
 - (c) 100 metres of any school, marae, or residential dwelling (excluding any dwellings owned by the consent holder); or
 - (d) 100 metres of any potable water abstraction point (Condition 8).

Resource Consent AUTH-201193-V5 requires the following:

- Wastewater shall not be irrigated onto land within 20 metres of any property boundary and that there shall be no spray drift beyond that property boundary (Condition 15).

5. WASTEWATER FARM

5.1 WASTEWATER FARM OVERVIEW

The Wastewater Farm, comprised of the BSM property and three neighbouring properties (as listed in 4.3.1), as the primary discharge of treated wastewater. There are overlaying farming operations, which include both cut and carry silage activities and small stock grazing. The extent of the Wastewater Farm is shown in Figure 3.

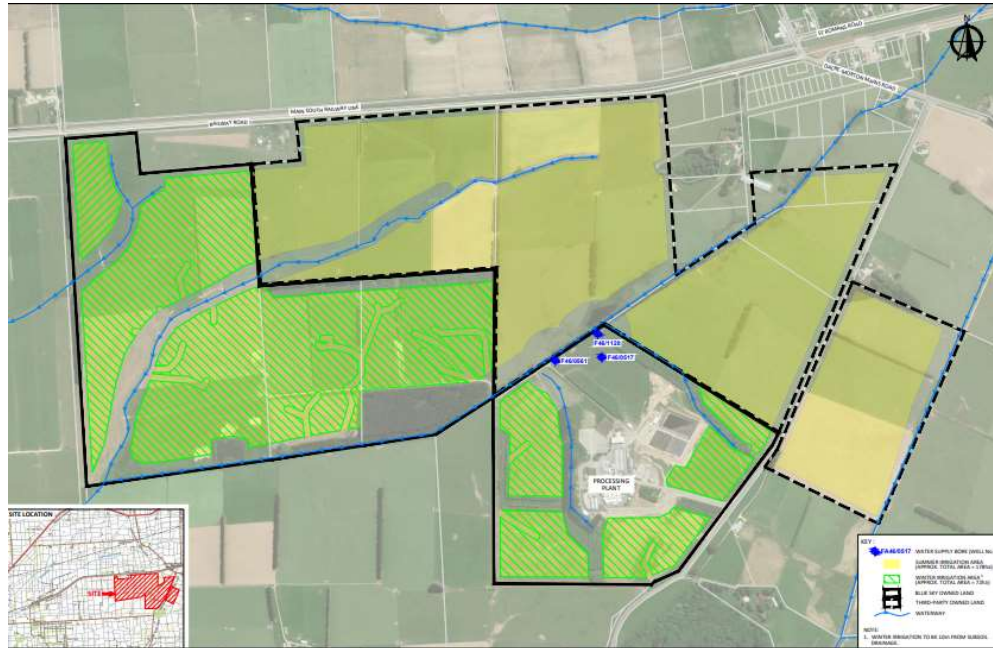


Figure 3: Wastewater farm map

5.2 ENVIRONMENTAL SETTING

BSM land treatment system spans two soil orders. These are brown soils and gley soils as identified in the Landcare Research (2020) S-Map. The soils mapping for the land treatment system is shown in Figure 4.

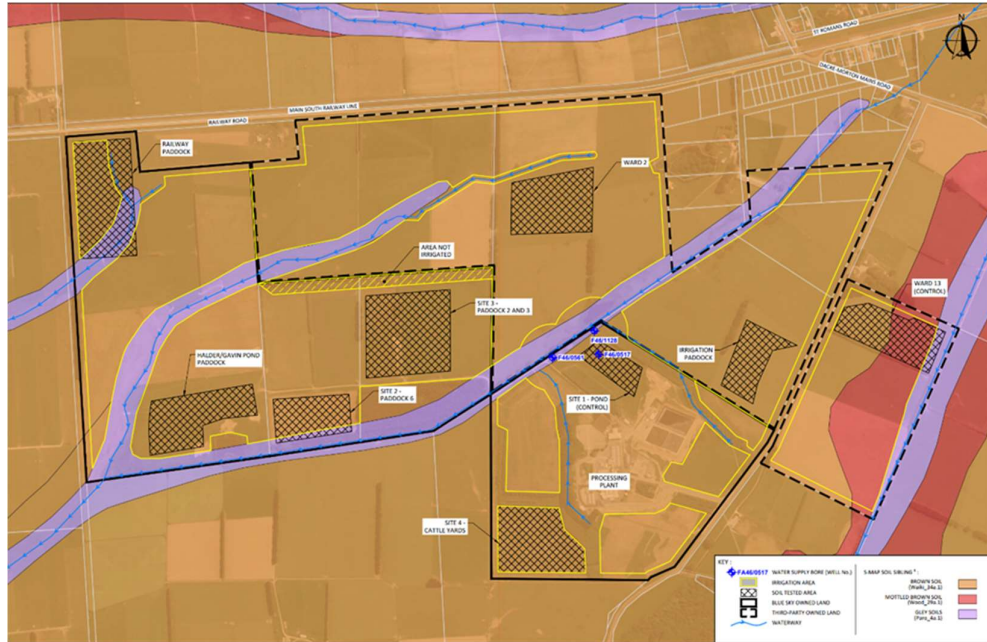


Figure 4: Wastewater irrigation areas, soil types and soil monitoring locations

There are numerous bores located within the Wastewater Farm and Site footprint areas. Bore uses include groundwater quality monitoring and water supply. All groundwater plant supply bores are within the BSM owned portion of the farm.

There are 7 monitoring bores in total, 5 are located within the BSM owned area and 2 located within the Leonard Ward owned property, as detailed in Figure 5 below.



Figure 5: Bore sampling locations

5.3 ENVIRONMENTAL RISK FACTORS

The potential environmental risks associated with wastewater applications to land are summarised in this section of the WFEMP. The tables below summarise the known and potential environmental risks based on the environmental setting based on data from ES published on the Beacon Website.

Table 2: Wastewater farm environmental risk factors overview

Soils	Soil Type	Vulnerability Factors		
		Structural Compaction	Nutrient Leaching	Waterlogging
	Waikiwi + Woodlands	Slight	Moderate	Slight
	Woodlands	Moderate	Slight	Moderate
	Dacre + Titipua	Moderate	Slight	Severe
	Dacre + Woodlands	Moderate	Slight	Severe
FDE Land Classification	<ul style="list-style-type: none"> - Impeded drainage or low infiltration rate - Artificial drainage or coarse soil structure - Sloping land - Multiple risk soil 			
Characteristics of FDE Classification	<ul style="list-style-type: none"> - Low to high risk to groundwater - Low to high risk to surface water 			
Groundwater Total Oxidised Nitrogen Concentration	<ul style="list-style-type: none"> - Estimated to be within a range of 1 – 3.5 mg/L at 7m bgl 			
Physiographic Zones and Associated Risks	Zone	Contaminant pathways for Physiographic Zone		
	Oxidising	Groundwater is susceptible to nitrate accumulation in drier months. During winter months of heavy rainfall events excess nitrogen leaches into underlying aquifers or surface waterbodies. Contaminants are also lost through artificial drainage and overland flow to nearby streams during wetter months or following heavy rainfall events.		
	Gleyed	Nitrogen is accumulated and stored during drier months, although some is lost through denitrification. Contaminants are also lost through artificial drainage and overland flow to nearby streams during wetter months or following heavy rainfall events.		
	Gleyed	As above, along with greater potential for overland flow resulting from a combination of slope and soil drainage properties.		
	Overland			
Groundwater Supply Bore	Present – BSM commercial water supply: Bores F46/0561, F46/0517 & F46-1128.			
Sensitive Areas	Neighbouring dwellings and public roadways – Refer to Figure 3. Ponds and waterways – Refer to Figure 3. Buffer zones required to be applied as described in Section 4.3.3.			

5.4 ENVIRONMENTAL RISK MITIGATIONS AND PROGRAMMES

Table 1 provides risk and mitigation actions for each of the focus areas on BSM wastewater farm.

Table 3: Farm management environmental risks and mitigations

Focus Area	Control	Specific Actions	Active (Y/N)	Improvement Action
Farm Management	Accurate record keeping.	Maintain records in relation to farm inputs (Fertiliser, WW loadings), outputs (cut & carry, stock) and management practices (grazing, re-grassing).	In progress	Develop a standard template and designate responsibility for maintaining accurate records in relation to farm inputs, outputs and management practices. Liaise with third parties to ensure the above information is captured.
	Pest Management.	Animal pests are controlled on a routine basis.	Y	-
	Stock management and grazing practices.	Low stocking rate of sheep, hogget's and lambs only. No intensive grazing to occur on within the BSM Wastewater Farm.	Y	-
	General aesthetics.	Complete aesthetic planting around BSM Site and entrance. Increase density and width of riparian planting along waterways where required.	Y	Completed 2020/2021 Ongoing.
Land Management	Reduce periods of bare soil when re-grassing pasture to reduce erosion and leaching.	Bare paddocks are re-sown as soon as practical. No intensive grazing to occur on the Wastewater Farm. No cropping to occur on the Wastewater Farm in areas which receive wastewater applications.	Y	-
Wastewater Management	Accurate record keeping.	Maintain records in relation to wastewater application events, application rates and nutrient loading.	Y	-

Focus Area	Control	Specific Actions	Active (Y/N)	Improvement Action
	Resource consent conditions are understood and complied with.	Refer to WFEMP Section 4.3.3.	Y	-
	Staff are trained on how to operate and maintain the wastewater irrigation system.	Refer to WFEMP Section 7.	Y	-
	Wastewater irrigation equipment is well maintained.	Refer to WFEMP Section 9.	Y	-
	Odour impact is considered prior to and during wastewater irrigation events.	Refer to WFEMP Section 8.1.1.	Y	-
	Sufficient suitable storage available to manage wet weather / high soil moisture events.	Refer to WFEMP Section 8.	Y	-
Nutrient Management	Wastewater nutrient load is spread evenly as practicable across the available area.	Maintain records in relation to wastewater application events, application rates and nutrient loadings and regularly review data to ensure that wastewater nutrient loadings are spread evenly as practicable across the available area.	Y	Automated computer data capture system developed for irrigation volumes, location and duration, implemented and operational. Refer Sections 5.5.2 and 6.
	Fertiliser applications are adjusted based on soil tests and set to meet plant needs.	Annual soil sampling and assessment of results by a suitably qualified soil scientist.	Y	-
	Reducing surplus nitrogen in the soil during autumn and winter.	Adjust wastewater treatment plant operation to reduce nitrogen concentrations in treated wastewater and manage cut and carry to minimise surplus nitrogen in the soil during autumn and winter.	In progress	-
Waterways and	All waterways are fenced with riparian margins enhanced	All waterways fenced as per National/ES regulations.	Y	Completed 2020/21.

Focus Area	Control	Specific Actions	Active (Y/N)	Improvement Action
Biodiversity Management	with riparian planting to filter any sediment run-off.	Riparian plantings have been established between waterways and fences.	Y	Undertake three-staged riparian planting programme (2020, 2021 and 2022). Riparian planting is ongoing. Appendix 10 contains the current riparian planting plan for the site.
	Risk areas for wastewater irrigation applications are identified and recorded on a map.	Risk areas where surface runoff may enter waterways are to be identified and mapped, along with set-back areas and CSA.	Y	Completed Traffic Light Map to include all available irrigation paddocks (Appendix 6).

Table 4: Improvement programme summary

Focus Area	Improvement Action	Due Date	Action Lead	Complete (Date)
Farm Management	Develop a standard template and designate responsibility for maintaining accurate records in relation to farm outputs and stock numbers.	1 Sept 2023	Environmental Officer	
	Liaise with L. Ward to ensure the above information, plus farm input details are captured for the Ward-owned section of the Wastewater Farm.	1 Sept 2023	Environmental Officer	
Land Management	Complete transition to Irrigator to monitor and manage treated wastewater application rates and developed a spreadsheet-based system to calculate nutrient loadings.	30 Mar 2021	Environmental Officer	October 2022
Nutrient Management	Review controls for managing surplus nitrogen in the soil during autumn and winter, and update WFEMP accordingly.	1 Sept 2022	Environmental Officer	July 2023
Waterways and Biodiversity Management	Complete Stage 3 of the riparian planting programme of works.	Dec 2023	Environmental Officer	Ongoing.
	Update the Traffic Light Map to include all available irrigation paddocks (Appendix 8).	1 June 2022	Environmental Officer	June 2022

5.5 WASTEWATER FARM OPERATIONS OVERVIEW

As previously detailed, the Wastewater Farm, comprised of both the BSM property and neighbouring properties, has the primary purpose of receiving and treating wastewater from the BSM Site. Overlaying farming activities which are intended to support and facilitate the wastewater discharge activities. The overlaying farming operations include both cut and carry silage activities and light stock grazing for BSM owned land. On third party land overlaying farming operation include normal stock grazing and cut and carry activities. These operations are operated and managed by the respective landowners. Cut and carry harvesting has an important function of exporting nitrogen from the irrigation area in the form of baleage.

Cut and carry silage operations typically occur from October to April, dependent upon climatic conditions and pasture yield. The farms are used to graze lambs and sheep year-round as is required to manage pasture quality and cover; however, it is of note that the farms primarily operate as cut and carry units rather than grazing blocks. Due to the focus being wastewater applications and treatment with an overlaying cut and carry operation, the stocking rate and grazing operations are considerably lower than would occur on a conventional sheep farming property. Grazing is however required to maintain pasture cover, particularly in areas not able to be harvested by cut and carry or during conditions which prohibit the access of heavy machinery.

In order for this operation to be successful the respective landowners are also required to manage pasture quality and soil fertility. An experienced and qualified Soil Scientist is consulted with as necessary to ensure effective land treatment of the wastewater within a productive farming operation.

5.5.1 Pasture Management

Introduction

For the pasture to achieve its main objective of treating wastewater whilst producing high quality silage; irrigation operations, cut and carry activities, and weed presence must all be managed effectively. These aspects are interlinked and are also reliant on good soil quality.

Irrigation Applications

Irrigation composition and volumes are fundamental aspects in supporting quality pasture. Section 4.3 explains in further detail how irrigation is managed in order to achieve both objectives of high-quality silage and effective wastewater treatment.

Cut and Carry Operations

An external contractor is engaged to undertake cut and carry operations and to distribute the resulting silage/baleage to local landowners. The feed is removed from the irrigation application area and is used on other properties.

Typically, three grass cuts are completed per season, although as described above this is dependent upon climatic conditions and pasture yield. The cut and carry season typically begin October/November, with the second cut occurring at the end of December/early January and the third cut at the end of February/early March. These dates are approximate as they are dependent on wastewater volumes, client requirements and weather. In particular, cut and carry should only occur in dry paddocks that have not received irrigation or rainfall for at least 1 day.

This operation is currently undertaken by a local contractor who utilises flotation tyres where practicable. This helps to mitigate excessive soil compaction, which is essential to maintaining a soil structure which is suitable for the assimilation and treatment of wastewater.

The success of the cut and carry operation is reliant on good communication between the respective landowner, the Wastewater Team and the Contractor.

Weed Control

Weeds on the farms are largely controlled via cut and carry whilst gorse, broom and dock leaf are sprayed by the respective landowner and/or their nominated contractor.

The areas around hydrants and monitoring bores are periodically sprayed to maintain their visibility between cut and carry operations. This is completed by the Wastewater Team.

Re-grassing

It is important that re-grassing is undertaken regularly as there is a risk of soil structure damage if it is not carried out as required. The decision to re-grass is made by the respective landowner and is based upon silage production and grass growth. BSM typically regrass one or two paddocks a year to maintain pasture quality and control weed infestations. Re-grassing is typically carried out in the autumn via the method of under-sowing existing pasture.

5.5.2 Soil Management

Introduction

Soil management is required to mitigate the effects of irrigation and cut and carry whilst limiting nutrient leaching. This is done in conjunction with an independent soil scientist who makes recommendations based on soil conditions and soil analysis results.

In order for the soil to act as a filtering media whilst maintaining bacteria to treat the wastewater and promote grass growth properties, a fine balance between soil nutrients and condition needs to be maintained, as is expanded on throughout this section.

Nutrient Management and Fertiliser

Nitrogen loading rates onto the irrigation farms from wastewater and fertiliser applications are managed to provide sufficient nitrogen for pasture growth while preventing excessive leaching of

nitrogen to the groundwater. The nitrogen content of the wastewater can be managed throughout the season by treating the wastewater through the biological treatment plant and adjusting the operating parameters of this plant to manage the nutrient loadings to the Wastewater Farms. Such adjustments are utilised where required to address any nitrogen deficiencies which occur.

The necessity of cut and carry for nitrogen removal can lead to soils deficient in some nutrients, particularly nitrogen, whilst the application of wastewater can lead to elevated loadings of others such as potassium. To counteract this soil analyses are undertaken annually to ensure nutrient levels are being maintained.

Before an application of fertilisers, and in particular urea nitrogen, the Environmental Officer shall ensure that nitrogen loadings are tracking as expected and the application will not breach consented nitrogen loading limits, which is limited to an annual average of 450 kg/ha averaged over irrigation areas predominantly utilising cut and carry of vegetation; and 350 kg/ha, averaged over all other irrigation areas. This is done through a spreadsheet (file name: Nitrogen Loading 2023.xlsx located in the Annual Compliance Report folder within the Environmental Management folder) which calculates the nitrogen application based off wastewater inputs from the Irrigator automatic system.

Infiltration Rates and Drainage

Soil infiltration rates and cation exchange capacity are monitored annually as per Resource Consent conditions (Condition 13). Monitoring is completed by an independent soil scientist who provides recommendations as well as a summary of results. When saturated soil infiltration rates are below 6 mm/hr, BSM undertakes appropriate remedial action by ripping the paddock, or tilling the paddock and resowing, or other suitable mechanical method.

The exchangeable sodium percentage (ESP) of soil is monitored annually. When ESP concentrations exceed 5%, gypsum or lime is applied to minimise the risk of soil dispersion and to assist in maintaining hydraulic conductivity.

Other recommended actions are implemented where required to manage and improve soil structure, and may include fertiliser applications and grass grub control.

6 MONITORING AND REPORTING²

6.1 WASTEWATER VOLUME MONITORING

An automated data software system has been developed, installed and implemented called Irrigator. Irrigator provides real-time monitoring of water irrigation status including:

- The date of all wastewater irrigation event;
- The volume of wastewater irrigation during each event; and
- Identifying the paddock which the wastewater was applied to.

Details about each of the paddocks are included in the system meaning that the irrigation application depth is calculated in real time. The number of days since the last pumping event is also automatically recorded. This information is displayed on a page that can be viewed at any time by the wastewater operators, and the Environmental Officer and the Rendering and Effluent Farms Manager. An example screen shot is provided in Figure 6 below.

The screenshot shows a web-based interface titled 'Run Data Tables'. It features a navigation bar with tabs for 'All Runs', 'Last Run Per Paddock', 'Current Run Depth', and 'Paddock Compliance'. Below the navigation bar is a filter input field and a '100 rows' dropdown menu. The main content is a table with the following columns: Paddock Name, Last Irrigation Time, Days Since Last Irrigation, Irrigation Volume (m³), and Irrigation Depth (mm). The table lists 20 different paddocks with their respective irrigation data.

Paddock Name	Last Irrigation Time	Days Since Last Irrigation	Irrigation Volume (m³)	Irrigation Depth (mm)
Basilis East			0.00	0.00
Basilis Middle			0.00	0.00
Basilis West			0.00	0.00
Blue Sky's Crossing			0.00	0.00
Cattle Yards North	03/10/22 08:20:00	0	308.88	12.87
Cattle Yards South	29/09/22 13:25:50	3	274.26	11.43
Cow Shed North	22/09/22 22:10:02	10	402.36	12.98
Cow Shed South	29/09/22 00:00:15	4	161.46	5.21
Five Acres			0.00	0.00
Front Paddock			0.00	0.00
Galvin Pond			0.00	0.00
Halder North			0.00	0.00
Halder South	03/10/22 08:20:00	0	40.06	1.18
Hay Barn Lower	29/09/22 13:47:05	3	354.41	9.33
Hay Barn Upper	30/09/22 17:30:50	2	569.88	15.00
Holding Paddock			0.00	0.00
Irrigation Paddock			0.00	0.00
Middle East	22/09/22 20:55:33	10	101.86	3.64
Middle West	22/09/22 07:46:15	11	178.98	6.39
Number 1	03/10/22 08:20:00	0	308.73	7.35
Number 2	29/09/22 11:47:14	3	569.32	16.74
Number 3			0.00	0.00

Figure 6: Irrigator screenshot showing irrigation status overview

² Resource Consent AUTH-201191-V1 includes monitoring requirements which are now historic. It is considered that these have since been fulfilled and as there are not on-going monitoring requirements, these particular elements have been excluded from Section 4.

When selecting the paddock to irrigate using a drop-down menu, the current status of each paddock is shown. Those that have not had wastewater irrigated to them for more than 14 days show an application depth of 0 mm. An example screenshot of this is provided in Figure 7.

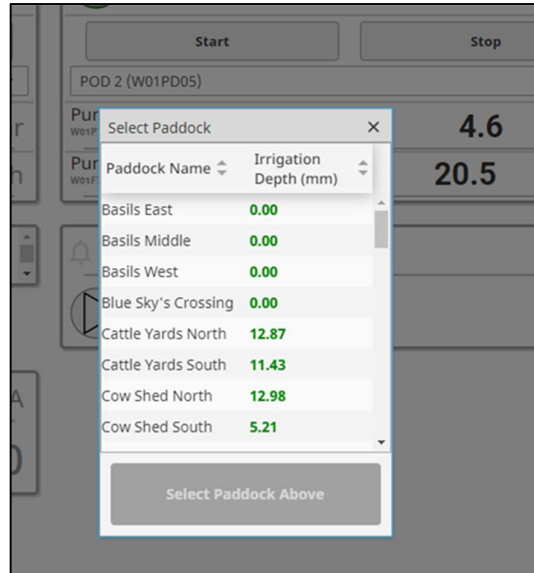


Figure 7: Irrigator screenshot showing the irrigation status of a paddock when commencing irrigation

If the irrigation status is within 5 mm of the maximum application depth, the paddock will highlight orange. In this example, the maximum application depth has been set to 25 mm to demonstrate this for the Trig North paddock. An example of the screenshot has been provided in Figure 8 below.

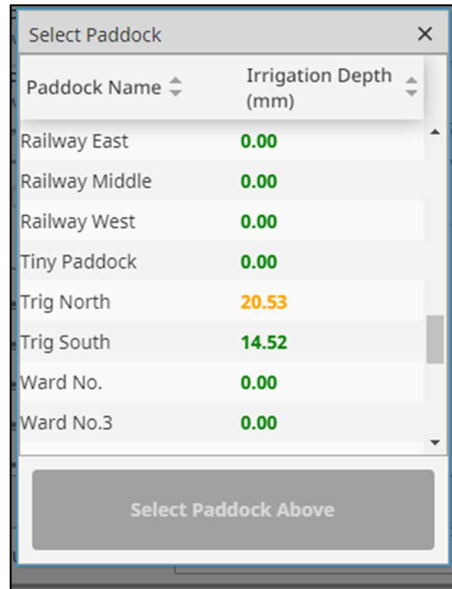


Figure 8: Irrigator screenshot showing that the wastewater irrigation limits are being approached

Irrigator also has in-built controls meaning that operators cannot commence pumping of wastewater to paddocks which have had more than 30mm of wastewater applied unless there has been more than 14 days since the last irrigation event. When the drop-down menu is accessed to select a paddock to irrigate to, those paddocks show red and pumping to them is disabled. A limit of 30mm has been applied, as this will ensure a 35 mm application depth cannot be reached as the pumping time is automatically limited for each event to ensure no more than 4mm of wastewater can be applied to any paddock per pumping event. An example screenshot is provided in Figure 9. In this example, the maximum application depth has been set to 20 mm to demonstrate this for the Trig North paddock.

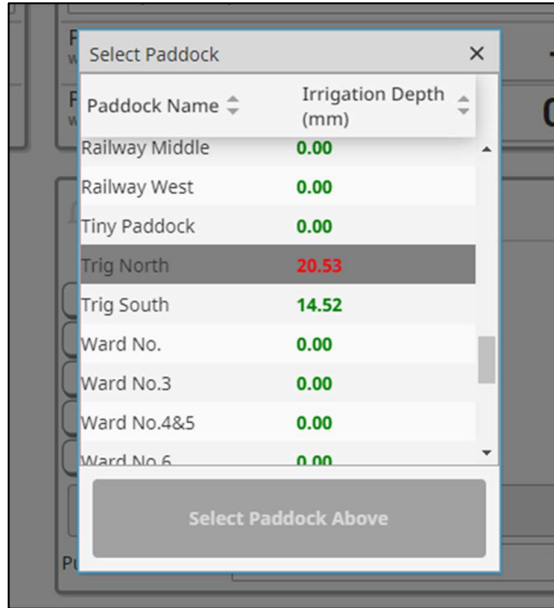


Figure 9: Irrigator screenshot showing paddock that has exceeded the irrigation depth limit

These improvements mean that it is not possible for wastewater to be irrigated to any paddock which does not comply with the maximum wastewater irrigation application depth and the minimum 14 day return time between application events.

6.2 WASTEWATER COMPOSITION MONITORING

Resource Consent AUTH-201191-V1 Condition 10(a) requires that the Consent Holder shall monitor the treated wastewater by collecting representative samples at least once per month. The Environmental Officer collects a representative grab sample from Pump 1 (refer to Figure 10).



Figure 10: Monthly sampling locations

Samples are analysed by an external laboratory for:

- pH;
- Sodium absorption ratio;
- Electrical conductivity;
- Total nitrogen concentration;
- e. Coli concentration;
- Total phosphorus concentration;
- Ammoniacal nitrogen concentration; and
- Oil and grease concentration.

Note: Condition 4(b) requires that only wastewater with a Sodium Absorption Ratio of less than 17 shall be applied to land.

The Environmental Officer collates and assesses results for compliance as they are received from the laboratory. An electronic spreadsheet named FARMCOMPLIANCE 2023.xlsx with the monitoring data is available upon request from the BSM Environmental Officer, as are electronic copies of the laboratory analysis result reports. These are found at the following file location: Environmental Management > Compliance.

6.3 NITROGEN LOADINGS

Resource Consent AUTH-201191-V1 Condition 7 limits the annual nitrogen loading rate from wastewater and fertiliser applications to an annual average of 450 kg/ha averaged over irrigation areas predominantly utilising cut and carry of vegetation; and 350 kg/ha, averaged over all other irrigation areas.

As detailed above, irrigation application volumes are entered into an Excel compliance monitoring spreadsheet which calculates nitrogen and phosphorus loading rates. This spreadsheet is managed and monitored by the BSM Environmental Officer to ensure compliance with nitrogen loading limits. The nitrogen application will be tracked alongside the wastewater volume within the irrigation control document.

Fertiliser application data is recorded by the Farm and By-products Manager and provided to the Environmental Officer. This data is also captured in the Excel compliance monitoring spreadsheet in order to monitor the combined nitrogen loading, as is required by Resource Consent AUTH-201191-V1 Condition 7.

6.4 SURFACE WATER MONITORING

Resource Consent AUTH-201191-V1 Condition 11 requires that the Consent Holder shall monitor the unnamed tributary of the south branch of the Waihopai River that runs through the disposal area on a monthly basis. The tributary is to be monitored upstream and downstream of the spray disposal site at nominated sampling points, with Condition 11(c) requiring that samples taken at the upstream and downstream sites on each monitoring occasion are to be taken at about the same time, within the period of 1 hour. The downstream sample should be taken first on each occasion. Collected samples are analysed for:

- pH;
- Electrical conductivity;
- Dissolved oxygen (DO) concentration;
- Ammoniacal nitrogen concentration;
- Total nitrogen concentration;
- Dissolved reactive phosphorus concentration;
- e. Coli concentration;
- Nitrate nitrogen; and
- Temperature (field measurement).

The Environmental Officer collates and assesses the results for compliance as they are received from the laboratory. Condition 24 and Consent AUTH-201191 -V1 Appendix A provide limits for in-stream effects and specifically in-stream temperature, pH, DO, e. Coli and total ammoniacal nitrogen. An electronic spreadsheet named FARMCOMPLIANCE 2023.xlsx with the monitoring data is available upon request from the Environmental Officer, as are electronic copies of the laboratory analysis result reports.

6.5 INLINE CONDUCTIVITY METERING

From 30 September 2012, BSM were required by Resource Consent AUTH-201191-V1 Condition 11(g) to install and monitor inline conductivity at the downstream monitoring point of the unnamed tributary of the south branch of the Waihopai River that runs through the disposal area. This condition requires that the conductivity is continuously monitored and electronically recorded, with the data being electronically reported to Environment Southland via an automated system on a daily basis.

The system is equipped with an alarm function (via text message) which alerts the Farm and By-products Manager, Environmental Officer and Wastewater Treatment Operators if the measured conductivity exceeds 280µs/cm. In the event that an alarm is activated, Operators are required to immediately inspect the tributary, both at the upstream and downstream monitoring locations, and record findings in the Conductivity Reading.xlsx file which can be found on the BSM Sharepoint Operations page, under Operations Documents. Any anomalies detected should be escalated to both the Environmental Officer and Farm and By-products Manager. In this instance, the Operator shall immediately inspect the wastewater irrigation to ensure that wastewater is not causing the effect in the tributary.

If the inspection shows a conspicuous change in the colour or clarity of the tributary, the BSM Environmental Officer or Farm and By-products Manager shall advise Environment Southland, as per the requirements of Condition 11(g)(iv).

Inline data is available via the Harvest System.

6.6 SOIL MONITORING

Resource Consent AUTH-201191-V1 Condition 13 requires BSM to monitor soil within the Wastewater Farm annually in May. Monitoring and sampling is required to be completed at a minimum of four locations, with at least three wastewater irrigation sites (two sites in the Waikiwi soil and one site in the Waikiwi mottled soils), and at least one control site (in an area where wastewater is not discharged). It should be noted that updated soil map indicated there are no Waikiwi Mottled Soil on the property. Soil types and monitoring locations are shown in Figure 4.

Soil samples are be analysed for the following parameters:

- Infiltration rate;
- Soil pH;
- Exchangeable calcium;
- Exchangeable magnesium;
- Exchangeable potassium;
- Exchangeable sodium;
- Phosphorus (Olsen P)
- Cation exchange capacity; and
- Total nitrogen concentration.

Analysis shall include the calculation of exchangeable sodium percentage (ESP) values for each sampling site. For this function, BSM engage an independent soil consultant to collect the required monitoring data and to analyse the subsequent results. Copies of the ensuing reports are held electronically by the Environmental Officer and are available upon request.

6.7 SOIL MOISTURE MONITORING

From 31 January 2013, BSM were required by Resource Consent AUTH-201191-V1 Condition 14 to install a soil moisture monitoring system at three sites within the wastewater irrigation area.

Condition 14 requires that the soil moisture is continuously monitored and electronically recorded, with the data being electronically reported to Environment Southland via an automated system on a 3-monthly basis.

An analysis was completed which determined that the equivalent field capacity levels at each of the monitoring sites. This detail has been entered into the automated Harvest monitoring system and accordingly, soil moisture deficits are presented as both a percentage (% filled pours) and millimetres (water holding capacity of the soil in millimetres relative to field capacity) for each respective monitoring site.

The Traffic Light Map contained in Appendix 6 presents the locations of the monitoring probes and classifies the soil risk types.

In the event that wastewater irrigation occurs when soils are at field capacity, BSM Operators are required to:

- Inspect of each of the irrigators while irrigating to check for conspicuous signs that soils are saturated;
- Inspect the application area to ensure that there is no wastewater ponding or run-off; and
- Inspect the position of the irrigator(s) relative to known drains.

Where applicable, these inspections are recorded in the Daily Effluent Checks.docx along with the upstream and downstream conductivity recorded at the time of the inspection. These files are located in the BSM Environmental Officer office and electronic copies are submitted to Environment Southland by BSM Environmental Officer on request.

Inline data is available from the Harvest Portal.

In the event of a failure with BSM's soil moisture monitoring system, Environment Southland's Woodlands soil-moisture monitoring site should be used instead, with the corresponding field capacity value. This information is available from ES' Beacon Website:

<https://maps.es.govt.nz/index.aspx?app=soil-moisture&ext=1183465,4827750,1293535,4882250>

6.8 GROUNDWATER MONITORING

As part of the 2021/22 re-consenting workstream, BSM installed seven monitoring bores across the Wastewater Farm in early 2021. The location of these bores is shown in Figure 11. The bores are designed to facilitate a baseline assessment of the area's shallow groundwater profile, both upstream and downstream of the discharge area, and to support with the assessment of effects associated with the wastewater discharge activity. A deeper groundwater monitoring bore was also installed and is monitored downstream of the discharge area. During the re-consenting programme, monthly samples are to be collected from each of the monitoring bores and analysed for the following parameters:

- Total nitrogen;
- Total kjeldahl nitrogen;
- Ammoniacal-nitrogen;
- Nitrate-nitrogen;
- Nitrite-nitrogen;
- Total phosphorus;
- Dissolved reactive phosphorus;
- Chloride;

- Sodium;
- e.Coli;
- Conductivity; and
- pH.

The BSM Environmental Officer is responsible for collating the monitoring results. Copies of the ensuing reports are held electronically by the BSM Environmental Officer and are available upon request. The groundwater monitoring data is included in the FARMCOMPLIANCE 2023.xlsx spreadsheet.



Figure 11: Groundwater monitoring locations

6.9 COMPLIANCE REPORTING

Automated Reporting

As per Resource Consent AUTH-201191-V1 Condition 11(g)(iii), conductivity readings collected from the in-stream inline conductivity meter are to be reported to Environment Southland via an automated system, with data provided at least once per day.

Additionally, Resource Consent AUTH-201191-V1 Condition 14(c) requires that soil moisture be continuously monitored and electronically recorded at designated locations, with the data being electronically reported to Environment Southland via an automated system on a 3-monthly basis.

The BSM Environmental Officer is responsible for the overall monitoring and management of these systems.

Upon Receipt Reporting

Resource Consent AUTH-201191-V1 Condition 12(a) requires that wastewater and surface water sample results shall be submitted to Environment Southland within 20 working days after the receipt of the laboratory analytical data. The BSM Environmental Officer is responsible for receiving, collating and submitting the required monitoring results.

Annual Reporting

Resource Consent AUTH-201191-V1 Condition 16 requires that BSM submit an annual report to ES, summarising and interpreting the monitoring results and compliance with the conditions of resource consent AUTH-201191-V1 during the previous 12 months. The summary of results shall include an analysis of any trends in the monitoring results. The annual report is required to be supplied to the Council's Environmental Compliance Manager by 31 August each year.

These reports are prepared and submitted by the BSM Environmental Officer or their delegate. Electronic copies of the reports are held on the BSM computer network.

Resource Consent AUTH-201193-V5 requires that records of complaints relating to odour from the site and wastewater irrigation activities are maintained by BSM, along with corresponding details (refer to Condition 18), and that such records shall be provided to Environment Southland annually or upon request.

The Environmental Officer is responsible for collating and submitting all odour complaint log entries to Environment Southland as required by Resource Consent AUTH-201193-V5.

Non-Routine Reporting

In the event of any treatment system failure which may cause a public health nuisance or risk, or the discharge of wastes to areas other than the disposal field, BSM are required to immediately notify the following parties:

- The Medical Officer of Health (or Health Protection Officer): (03) 474 0999
- Environment Southland's Environmental Compliance Manager: 0800 76 88 45.

Similarly, if inline conductivity monitoring required by Condition 11(g) identifies that the in-stream conductivity is greater than 280µs/cm and subsequent visual inspection identifies that there is visual contamination, the Environmental Officer or BSM General Manager of Operations (GMO) must advise ES.

In the event that ES determine that BSM's activities are causing odour nuisance, BSM is required to instigate a systematic odour diary programme in accordance with Condition 19 of AUTH-201193-V5 during the subsequent year to establish the characteristics of odour impacts caused

by the discharges. The design of the odour diary programme shall be in accordance with recognised good practice and shall be to the satisfaction of ES. Results of the odour diary programme shall be reported to ES within two months of completion of the programme. The report shall include an assessment of the need for mitigation of any adverse effects identified.

The Environmental Officer is responsible for co-ordinating such a survey if required and for submitting the resulting report to ES as required by Resource Consent AUTH-201193-V5.

7 RESPONSIBILITIES AND COMMUNICATION

7.1 RESPONSIBILITIES

Various components of the overall wastewater treatment and distribution system are managed and overseen by various BSM staff members. Farming operations on the BSM-owned portion of the Wastewater Farm are managed and co-ordinated by BSM staff, whereas farming operations on the Ward-owned portion of the Wastewater Farm are managed and co-ordinated by those Landowners with support from BSM staff where appropriate. The relevant contact details and a summary of respective responsibilities is presented below:

Table 5: Environmental and operational responsibilities summary

Role	Name	Environmental and Operational Responsibilities
BSM General Manager Operations	Steve Paynter	<ul style="list-style-type: none"> - Oversee site activities and in particular co-ordinating production, utility operations and environmental requirements, where applicable; - Oversee the capital planning process site/WWTP improvements and repairs/maintenance where appropriate; - Authorise plant maintenance on consideration of data from the Rendering & Effluent Farms Manager in the event of an unauthorised discharge to land and/or air; and - Authorise plant shut down where maintenance is not effective at alleviating or eliminating an unauthorised discharge to land and/or air.
BSM Farm and By-products Manager	Karl Evans	<ul style="list-style-type: none"> - Ensure that documented standard operating procedures (SOPs) are in place for all systems related to discharge of contaminants to land and air, in order to prevent, minimising or eliminate emissions to the environment; - Ensure that departmental staff members are aware of the documented standard operating procedures and procedures for responding to or investigating abnormal operations which may lead to unauthorised discharges; - Ensure that adequate training is given to all personnel who operate these systems; - Assist with the capital planning process for Site and WWTP improvements and repairs/maintenance where appropriate; - Day-to-day management of the Wastewater Operators; - Ensure that departmental staff members are aware of the documented standard operating procedures and procedures for responding to or investigating abnormal operations which may lead to unauthorised discharges; - Ensure that adequate training is given to all personnel who operate these systems; - Ensure equipment is maintained and calibrated as required; - Oversee and manage farming operations on the BSM-owned portion of the Wastewater Farm, including co-ordination of cut & carry operations; and - Ensure that farming activities align with Resource Consent requirements where applicable, and with the WFEMP.

Role	Name	Environmental and Operational Responsibilities
BSM Environmental Officer	Jacob Read	<ul style="list-style-type: none"> - Ensure that resource consents are adhered to, including monitoring and reporting requirements to ES; - Ensure that staff are made aware and understand these consents and the relevant management plans, where applicable to their roles and responsibilities; - Supply data to the GMO for consideration of maintenance or ultimately shutdown of equipment where an adverse discharge event occurs; - Implementation and maintenance of the WFEMP, including submitting the Plan to Environment Southland as required; - Ensure documented procedures are in place for responding to or investigating abnormal operations which may lead to unauthorised discharges and/or odour complaints; - Liaise with Environment Southland, associated land-owners, site operators in relation to wastewater treatment and discharge, and consent compliance; - Collecting and dispatching compliance-related environmental samples, collating resulting data and completing assessments of compliance/trends; and - Engaging suitable contractors to complete environmental compliance and/or improvement workstreams where appropriate or required by resource consent (e.g., soil sampling).
BSM Wastewater Operators	Various	<ul style="list-style-type: none"> - Monitor wastewater sump levels, volumes and daily data to avoid uncontrolled spillages; - Direct contact with BSM Managers in regard to equipment failures, leakages, overflows; - Daily operation of the WWTP system, including the biological system and land-based discharge system; and - Routine inspections of the irrigation equipment and application areas. Specifically, these inspections shall be undertaken at the frequencies specified in Section 8.1.3 and shall include (but not be limited to) inspection of the soils, paddock areas, pipelines, hydrants and irrigators.
Neighbouring Farm Operations	Neighbouring Property Owners	<ul style="list-style-type: none"> - Overseeing and managing farming operations on the Ward-owned portion of the Wastewater Farm; and - Ensuring that farming activities align with Resource Consent requirements where applicable, and with the WFEMP.

7.2 COMMUNICATION STRUCTURES

In order to ensure that wastewater discharge activities and farming operations operate effectively and in accordance with Resource Consent requirements, effective communication is imperative. As there are various team members as well as contractors, communication occurs via a range of formats including informal daily communication, documented meetings, formalised communication procedures and escalation processes. The processes and associated responsibilities are presented below. Escalation processes are expanded upon in the BlueSky Pastures Reporting Lines SOP (BSM003 Reporting Lines) and in Section 8 of this Manual.

Table 6: Communication responsibilities summary

Role	Name	Communication Responsibilities
BSM General Manager Operations (GMO)	Steve Paynter	<ul style="list-style-type: none"> - Communicate strategic direction and operational directives to the BSM Team; - Report to the BSM Board on various matters, including environmental compliance, risks and focus areas; - Support with and/or lead liaison with Environment Southland, associated land-owners, community stakeholders, site operators in relation to wastewater treatment and discharge, and consent compliance; - Document and communicate SOPs to ensure that departmental staff members are aware of the operating procedures and procedures for responding to or investigating abnormal operations which may lead to unauthorised discharges; - Report to the GMO and Environmental Officer on operational matters which may impact upon WWTP/irrigation operations and/or resource consent compliance; - Day-to-day communication with the Wastewater Operators, including direction on operational matters and guidance on resource consent requirements; - Communicate documented standard operating procedures and procedures for responding to or investigating abnormal operations which may lead to unauthorised discharges; and - Co-ordination of cut and Carry operations and associated communication between the contractor and Wastewater Operators.
Environmental Officer	Jacob Read	<ul style="list-style-type: none"> - Responsible for reporting to ES as per Resource Consent requirements; - Support with the communication of SOPs to ensure that departmental staff members are aware of the operating procedures and procedures for responding to or investigating abnormal operations which may lead to unauthorised discharges; - Support with day-to-day communication with the Wastewater Operators, including guidance on resource consent requirements; - Supply data to the GMO Operations for consideration of maintenance or ultimately shutdown of equipment where an adverse discharge event occurs; - Implementation and communication of the WFEMP, including submitting the Plan to Environment Southland as required; and - Liaise with Environment Southland, associated land-owners, site operators in relation to wastewater treatment and discharge, and consent compliance.
BSM Wastewater Operators	Various	<ul style="list-style-type: none"> - Direct contact with BSM Managers in regard to equipment failures, leakages, overflows; and - Daily communication with Neighbouring Property Owners.
Neighbouring Farm Operations	Neighbouring Property Owners	<ul style="list-style-type: none"> - Daily communication with Wastewater operators in relation to the interaction between wastewater irrigation and farming activities.

7.3 CONTACT DETAILS

Table 7: Key contacts details

Role	Name	Contact Details
BSM GM Operations	Steve Paynter	027 255 5191 steve@bluesky.co.nz
BSM Plant Manager	Jason O'Connell	027 267 5499
		jason@bluesky.co.nz
BSM Environmental Officer	Jacob Read	027 909 8614 jacob.read@bluesky.co.nz
BSM Farm and By-products Manager	Karl Evans	027 351 9438 karl.evans@bluesky.co.nz
BSM Wastewater Operators	Daryl Lee	027 233 1636
	Wayne Jones	027 2394779
IT Support	Peter Marshall	027 220 1589 peter.marshall@bluesky.co.nz
Third party property owners	Leonard Ward	03 231 3303 Railway Road Morton Mains, Invercargill 9893 Owner Lot 9 DP 159, Lot 12 DP 159, Lot 13 DP 159, Lot 292 DP 155 and Lot 293 DP 155
	David Alan Burnett and Graham Colin Ward	Owner Lot 1 DP 12194
	Graham Colin Ward and Vicki Maree Ward	Owner Lot 1 DP 8287
Environment Southland	Pollution Hotline	0800 76 88 45
Medical Officer of Health (or Health Protection Officer)	-	03 211 0900
Hire pool (containment pump equipment hires)	-	03 218 2666
Enviro South Ltd (Effluent tanker contractor)	-	0800 181 181

8 CONTINGENCY PLANS

8.1 ODOUR, SPRAY DRIFT, RUNOFF AND PONDING MANAGEMENT

8.1.1 Odour Management

Resource Consent AUTH-201193-V5 requires that the discharges to air from the processing site and the irrigation activities do not cause odour that is offensive or objectionable to such an extent that it has an adverse effect on the environment beyond the boundary of the property on which the consent is exercised.

Accordingly, BSM has a number of controls to minimise and manage potential odour sources:

- Management of the WWTP in accordance with SOP and good management practices. This ensures that the wastewater held in the irrigation lagoon does not become anaerobic, which is a potential cause for adverse odours to be emitted when treated wastewater is irrigated to land. Wastewater is treated to a high standard before being discharged to the irrigation lagoon reducing the risk of anaerobic treated wastewater being irrigated to land. In addition, an aerator is always available in the irrigation lagoon to maintain aerobic conditions if required;
- Wastewater storage at the WWTP irrigation lagoon is minimised in order to minimise the potential for treated wastewater to become stagnant and odoriferous. Where wastewater is retained in the irrigation lagoon, it is aerated to prevent it from becoming anaerobic when required;
- Irrigation buffer zones required by the resource consents are observed. This includes the requirements of Resource Consent AUTH-201193-V5 which specifies that wastewater shall not be irrigated onto land within 20 metres of any property boundary (Condition 15). In addition Consent No: 201191-V1 requires a buffer zone of 100 metres to be maintained between the discharge of treated wastewater on to land and any school, marae or residential dwelling (excluding dwelling owned by BSM); and
- Odour resulting from irrigation operations is monitored by a combination of operational staff observations, interaction with neighbours and feedback from community stakeholders. Where odour related issues are identified, the cause will be investigated, and the operation modified to address the root cause of the issue. Such controls may include changes to the operating conditions of the WWTP, as well as start-up management and selection of irrigation areas relative to the sensitive receptor and consideration of wind conditions.

8.1.2 Spray Drift Management

Resource Consent AUTH-201193-V5 requires that there be no spray drift beyond the BSM property boundary. Accordingly, operations are managed with stringent adherence to buffer zone requirements (refer to Section 4.3.3). Additionally, the prevailing wind direction is taken into account before commencing irrigation. This is particularly important when irrigation in proximity to neighbouring dwellings and the Woodlands Morton Mains Road.

A further control is the use of low impact K-Line pod sprinklers which is key to preventing spray drift migrating beyond the property boundary.

Shelterbelts for the management of spray drift has been employed on some boundaries. This is not part of the primary method of control and as such shelterbelts are not appropriate for all neighbouring properties. Shelterbelts that are currently in place will continue to be maintained and no established shelterbelt will be removed unless it is requested by the neighbouring property or under circumstances where health and safety or property is at risk.

8.1.3 Prevention of Runoff

BSM has implemented several controls to minimise the potential for run-off of wastewater beyond the property boundary and/or to waterways. These controls include:

- Utilisation of an irrigation system with low instantaneous application rates to prevent soils from becoming saturated and ponding to occur as a result of wastewater applications;
- Utilising the storage capacity within the WWTP in order to defer irrigation during wet weather conditions/high soil moisture conditions and/or to adjust application rates to suit soil conditions and soil types;
- Minimising the potential effects of any rainwater running off during heavy rainfall by completing riparian planting alongside the unnamed tributary of the south branch of the Waihopai River where it flows through the Wastewater Farm (currently in progress). The potential for runoff will be monitored by BSM staff to ensure that suitable riparian margins are maintained;
- Use of an early detection system, being the inline conductivity meter at the downstream monitoring point of the unnamed tributary of the south branch of the Waihopai River that runs through the disposal area;
- On-site soil moisture measurement is continuously completed at three sites within the wastewater irrigation areas, as detailed in Section 6.7. Should wastewater irrigation occur when soils are at field capacity, additional precautions are required to be taken by Wastewater Operators including inspection of each of the irrigators while irrigating to check

for conspicuous signs that soils are saturated, wastewater ponding or run-off, and the position of the irrigator relative to known drains. Such inspections shall be recorded, along with the upstream and downstream conductivity recorded at the time of the inspection;

- As standard practice, waterways in close proximity to irrigation areas are inspected at least daily for visible adverse effects and/or signs of contamination;
- Should one but not all of the soil moisture metres indicate the respective area is at field capacity, Wastewater Operators are required to assess all options within the available disposal area and preferentially utilise areas which are not currently at field capacity. Where an area is identified as being suitable (i.e., another paddock/area), irrigation operations shall be relocated to this point and applications resumed;
- During periods of elevated soil moisture, BSM staff are required to visually inspect the discharge area on a 2-3 hourly basis while the irrigation system is operating. Physical inspections include the potential for run-off and ponding; and
- Ensuring that pipeline connections and/or hydrant outlets are fitted with camlock covers (end caps) to prevent excess spillage when pipelines are decoupled that may otherwise result in localised ponding or run-off. This control is also essential to preventing backflow of the wastewater when the lines are not in use.

8.1.4 Management of Ponding

Resource Consent AUTH-201191-V1 requires that there shall be no significant ponding of wastewater resulting from the application wastewater to pasture. Significant ponding is deemed to have occurred if wastewater remains on an area of more than 50m², 24hrs after being irrigated.

The following actions are required to be taken in the event that significant ponding is observed:

- Temporarily cease irrigation applications in the area;
- Re-distribute wastewater to a more suitable location (i.e. soil type or soil moisture conditions);
- Investigate the cause of the ponding (e.g., soil moisture levels, general soil condition) and ensure that the irrigators are functioning correctly (i.e., sprinkler heads not blocked, lay flat hosing in good repair, hydrant connected to hosing correctly); and
- Record all information / actions / discussions and escalate as per BSM procedures.

8.2 EQUIPMENT/PIPELINE FAILURE MANAGEMENT

As detailed in Section 4.3.2, each of the irrigation supply pumps is fitted with high- and low-pressure cut-outs and GPS systems. The low-pressure cut-out stops the pump in the event of a burst irrigation hose or pipe and the high-pressure cut-out in the event of a blockage. If a failure is detected the Operator will be alerted and investigative action must be undertaken immediately.

In the event that a pipeline failure alarm is activated, the Operators shall inspect the lines and arrange for repairs to be made to the pipeline as required before using it for further irrigation. Similar actions are required to be taken when a physical failure is identified (e.g., visual leakage from a pipeline, mainline or hydrant).

All information / actions / discussions shall be recorded, and escalations completed as per BSM procedures.

8.3 NON-COMPLIANCE MANAGEMENT

All incidents which have or may cause a non-compliance with resource consent conditions are to be referred immediately to the Environmental Officer, or in their absence to the BSM REFM Operations. Refer to Appendix 3 for detailed reporting lines and trigger points and Appendix 4 for the Incident Investigation Form.

Resource Consent AUTH-201191-V1 requires that in the event of any treatment system failure which may cause a public health nuisance or risk, or the discharge of wastes to areas other than the disposal field, that BSM shall notify, without undue delay, both the Medical Officer of Health (or Health Protection Officer) (03 211 0900) and the Council's Environmental Compliance Manager (Pollution Hotline – 0800 76 88 45), as appropriate.

All non-compliances with Resource Consent conditions require a formal problem solve to be undertaken to identify root cause. Once the root cause has been identified, corrective and/or preventative actions are to be implemented prior to closing out the non-compliance.

As detailed in Section 7, the Environmental Officer is responsible for co-ordinating the above and providing associated records to ES in accordance with the requirements of Resource Consent AUTH-201191-V1.

8.3.1 Run-Off / Unauthorised Discharge to Water Specific Response Requirements

In the event of an incident occurring that may result in an unauthorised discharge to land or over-application to land, the wastewater is to be contained as quickly as possible. Interim measure that may be appropriate include:

- Stopping the irrigation pump immediately;
- Preventing overland flow by excavating cut-off drains;
- Using hay bales to soak up ponded wastewater; and
- A pump for directing contained run-off back to pasture is available from Hire pool (24hr number: 03 218 2666 or alternatively an effluent tanker contractor is available through Enviro South Ltd (0800 181 181).

8.4 COMPLAINT MANAGEMENT

All external complaints are to be referred immediately to the Environmental Officer, or in their absence to the BSM RFEM Operations. In the event of a complaint being received, the following actions are required to be taken:

- The following details must be collected and recorded (refer to Appendix 5 for the Complaint Register Form)
 - (a) the location where the effect was detected by the complainant;
 - (b) the date and time when the effect was detected;
 - (c) a description of the wind speed and wind direction when the effect was detected by the complainant;
 - (d) the most likely cause of the effect detected; and
 - (e) any corrective action undertaken by the consent holder to avoid, remedy or mitigate the effect detected by the complainant.
- All formal complaints require a formal problem solve to be undertaken to identify root cause. Once the root cause has been identified, corrective and/or preventative actions are to be implemented prior to closing out the complaint entry.
- As detailed in Section 7, the Environmental Officer (or their delegate) is responsible for coordinating the above and providing associated records to ES in accordance with the requirements of Resource Consent AUTH-201191-V1 and AUTH-201193-V5.

9 MAINTENANCE PLANS

9.1 MAINTENANCE REQUIREMENTS

BSM undertakes the following system checks, maintenance and procedures to ensure the irrigation system is reliable, functional and compliant:

- All equipment is maintained to a high engineering standard, including monthly checks of the automatic cut-off system operation and irrigator mechanical parts;
- Each irrigator, including hoses and couplings, is checked at least twice per day when operational; and
- Two-hourly checks are completed during the first eight-hour period after maintenance activities have occurred and during daytime operation to ensure satisfactory performance of the system.

Appendix 1 – Resource Consent AUTH-201191-V1



**Application No: B094-006
Consent No:201191-V1**

Cnr North Road and Price Street
(Private Bag 90116)
Invercargill

Telephone (03) 215 6197
Fax No. (03) 215 8081
Southland Freephone No. 0800 76 88 45

Discharge Permit

Pursuant to Section 105(1) of the Resource Management Act 1991, a resource consent is hereby granted by the Southland Regional Council (the "Council") to Blue Sky Meats (NZ) Ltd (the "consent holder") of Morton Mains, R D 1, Invercargill from 23 May 2003.

Please read this Consent carefully, and ensure that any staff or contractors carrying out activities under this Consent on your behalf are aware of all the conditions of the Consent.

Details of Permit

Purpose for which permit is granted: To discharge meat processing and rendering plant wastewater to land via a spray irrigator

Location - site locality Morton Mains
- map reference F46:745:195
- catchment Waihopai
- receiving environment Land

Legal description of land at the site: Lot 1 DP 595 and Part Lots 7 & 8 DP 159 being part Section 42 Block VIII Lothian Hundred; Lots 9, 12 and 13 DP 159 and Lots 292 and 293 DP 155 being Section 42 Block VIII Lothian Hundred; Lot 1 DP 12016 being part Section 12 Block VIII Lothian Hundred; Lot 1 DP 8287 and Lot 1 DP 12194.

Expiry date: 31 December 2022

History of Changes and Transfers

- Conditions reviewed on 22 August 2012
- Conditions varied on 22 November 2018

Schedule of Conditions

Consent Period

Environment Southland is the brand name of the Southland Regional Council.

1. This resource consent shall:
 - (a) commence upon expiry, surrender or lapse of Resource Consent 94301; and
 - (b) shall expire on 31 December 2022.

Effluent Irrigation

2. The effluent shall be irrigated on to the land identified in Schedule 1.
3. The maximum rate of discharge shall not exceed 1,000 m³/day.
4.
 - (a) This consent authorises the discharge of treated effluent to land via spray irrigation.
 - (b) Only wastewater with a sodium adsorption ratio less than 17, shall be discharged onto land.
 - (c) This consent does not authorise the disposal of treated or untreated effluent to any surface watercourse, or disposal of effluent directly into the ground via artificial, free-draining areas.
 - (d) No discharge shall occur onto:
 - (i) Dacre Silt Loam or Otikerama Silt Loam soils;
 - (ii) Waikiwi mottled soil during the period 1 May to 30 September;
 - (iii) Waikiwi mottled soil when the soil is wetter than field capacity.
5. The depth of effluent application onto any area of land shall not exceed:
 - (i) 30 mm, as an average of each application during the period 1 July to 30 June each year;
 - (ii) 35 mm for any individual application.
6. There shall be at least 14 days between applications of effluent onto the same area of land.
7. The annual nitrogen loading rate from irrigation of effluent and fertilisers shall not exceed:
 - (a) 450 kg/ha averaged over irrigation areas predominantly utilising cut and carry of vegetation; and
 - (b) 350 kg/ha, averaged over all other irrigation areas.
8. There shall be no discharge of treated effluent onto land, including spray drift, within:
 - (a) 20 metres of any surface watercourse;
 - (b) 20 metres of any property boundary;
 - (c) 100 metres of any school, marae, or residential dwelling (excluding any dwellings owned by the consent holder); or
 - (d) 100 metres of any potable water abstraction point.
9. There shall be no surface runoff/overland flow or significant ponding of wastewater resulting from the application of the treated effluent to pasture.

Monitoring

10. The consent holder shall monitor the treated effluent discharge by taking representative samples, at least once per month, and analysing the samples as follows:

- (a) Each sample shall be analysed for:
- pH
 - Sodium absorption ratio
 - electrical conductivity
 - total nitrogen concentration (i.e. nitrate¹ + Kjeldahl nitrogen)
 - E. coli concentration;
 - total Phosphorus concentration;
 - Ammoniacal Nitrogen concentration;
 - oil and grease concentration;
- (b) in addition to the analysis specified in condition 10(a), samples shall be analysed for the following at the frequencies specified in condition 10(c):
- Bromide concentration;
 - Chloride concentration;
 - Iodide concentration;
 - Fluoride concentration;
 - Boron concentration;
- (c) (i) until 30 June 2014, each sample shall be analysed for the parameters specified in condition 10(b)
- (ii) from 1 July 2014, at least one sample every three months shall be analysed for the parameters specified in Condition 10(b)

11. The consent holder shall monitor the unnamed tributary of the south branch of the Waihopai River that runs through the disposal area as follows:

- (a) The tributary is to be monitored upstream and downstream of the spray disposal site, at points determined in consultation with the Council's Environmental Compliance Manager.
- (b) Samples are to be taken at least once per month.
- (c) The samples taken at the upstream and downstream sites on each monitoring occasion are to be taken at about the same time, within the period of 1 hour. The downstream sample should be taken first on each occasion;
- (d) The samples are to be analysed for:
- pH
 - electrical conductivity

¹ Assumes nitrite is not significant.

- Dissolved Oxygen concentration
 - Ammoniacal Nitrogen concentration
 - Total Nitrogen concentration
 - Dissolved Reactive Phosphorus concentration
 - *E. coli* concentration
 - Nitrate nitrogen
 - Temperature (field measurement);
- (e) In addition to the analysis specified in condition 11(d), samples shall be analysed for the following at the frequencies specified in condition 11(f):
- Bromide concentration;
 - Chloride concentration;
 - Iodide concentration;
 - Fluoride concentration;
 - Boron concentration;
 - Carbonaceous Biochemical Oxygen Demand (BOD₅) concentration
- (f) (i) until 30 June 2014, each sample shall be analysed for the parameters specified in condition 11(e);
- (ii) from 1 July 2014, analysis for the parameters specified in condition 11(e), shall occur at the same frequency, and coincide with the same monitoring event, as specified in condition 10(c);
- (g) (i) by 30 September 2012, the consent holder shall install a conductivity meter at a downstream site to be agreed with Environment Southland's Compliance Manager, and shall thereafter continuously monitor and electronically record (at 15 minute intervals) electrical conductivity in the tributary;
- (ii) the meters shall be calibrated periodically, and shall be maintained in accordance with the manufacturers guidelines;
- (iii) the conductivity readings are to be reported to Environment Southland via a system that can automatically send the data into Environment Southland's computer database in CSV format, Hilltop or Tideda format, or XML formatted as required by Hilltop software. The data is to be provided at least once per day;
- (iv) if the electrical conductivity readings exceed 280 $\mu\text{s}/\text{cm}$ (or other figure agreed in writing by Environment Southland's Compliance Manager), the consent holder shall, without undue delay, inspect the tributary at the upstream and downstream sites. If the inspection shows a conspicuous change in the colour or clarity of the tributary, the consent holder shall advise Environment Southland (email: escompliance@es.govt.nz, or phone 0800 76 88 45) and shall immediately inspect the wastewater irrigation to ensure that wastewater is not causing the effect in the tributary.
12. Water and wastewater quality monitoring, other than the monitoring in condition 11(g), shall comply with the following criteria:

Environment Southland is the brand name of
the Southland Regional Council

- (a) the results of the monitoring are to include reference to the method of analysis, and the results of the monitoring specified in Condition 11 are to be supplied to the Council's Environmental Compliance Manager no later than 20 working days after the receipt of the laboratory analytical data;
- (b) the parameters specified in conditions 10 and 11 shall be analysed in accordance with the most recent edition of APHA "Standard Methods for the Examination of Water and Wastewater" or by the methods approved in writing by the Council's Director of Environmental Management; and
- (c) where the laboratories carrying out analyses required by this consent are not accredited to ISO7025, either by IANZ (formerly TELARC) or by an organisation with a mutual recognition agreement with the IANZ, for those analyses, then the Southland Regional Council may once every 12 months audit the consent holder's monitoring methods and analyses by obtaining and analysing split samples of the samples taken in accordance with conditions 10 and 11 above. The cost of each audit is to be met by the consent holder.
13. The consent holder shall monitor soil on the site during the month of May each year as follows:
- (a) Samples shall be taken from, and the measurements made in, at least three wastewater irrigation sites (two sites in the Waikiwi soil and one site in the Waikiwi mottled soils), and at least one control site (in an area where effluent is not discharged).
- (b) Soil samples shall be analysed for the following:
- infiltration rate
 - soil pH
 - exchangeable calcium
 - exchangeable magnesium
 - exchangeable potassium
 - exchangeable sodium
 - phosphorus (Olsen P)
 - Cation Exchange Capacity
 - Total nitrogen concentration
- Analysis shall include the calculation of exchangeable sodium percentage (ESP) values for each sampling site.
14. By 31 January 2013, the consent holder shall establish, and thereafter carry out, on-site soil moisture measurement at three sites within the wastewater irrigation areas as follows:
- (a) the consent holder shall install and maintain Aquaflex soil moisture tape(s), or alternative soil-moisture measurement device or method of similar accuracy as agreed by the Southland Regional Council's Compliance Manager;
- (b) the exact monitoring locations shall be to the satisfaction of the Council's Compliance Manager;

Environment Southland is the brand name of
the Southland Regional Council

- (c) unless otherwise agreed by the Compliance Manager the soil moisture data collected in accordance with this condition is to be recorded at 30 minute intervals using an electronic datalogger system and this record shall be provided to the Council's Compliance Manager at least once every three months;
 - (d) by 1 October 2013, the consent holder shall, from the on-site monitoring record, determine the soil-moisture contents that are equivalent to field capacity at each of the monitoring sites and shall report this to the Council's Compliance Manager;
 - (e) until the on-site soil moisture equivalent to field capacity is established in accordance with condition 14(d), the soils of the wastewater irrigation area shall be considered to be at field capacity when Environment Southland's Woodlands soil-moisture monitoring site is at or above field capacity, as shown at <http://map.es.govt.nz/Departments/LandSustainability/fde/guidelines/index.aspx#graphs>, or by an alternative method agreed by Environment Southland's Compliance Manager;
 - (f) unless otherwise restricted by measures developed in accordance with condition 22, if wastewater irrigation occurs when soils are at field capacity, the consent holder shall take additional precautions, including but not limited to, inspection of each of the irrigators while irrigating to check for conspicuous signs that soils are saturated, wastewater ponding or run-off, and the position of the irrigator relative to known drains. These inspections shall be noted, and the upstream and downstream conductivity recorded at the time of the inspection. A copy of this record shall be included with the annual report specified in Condition 16.
15. By 31 January 2013, the consent holder shall construct or implement measures to ensure, as far as is practicable, that samples can be taken at the upstream and downstream water sampling sites in the tributary of the Waihopai River under mean to very low flow conditions. These measures shall be agreed by Environment Southland's Compliance Manager prior to construction or implementation.
16. An annual report, summarising and interpreting the monitoring results and compliance with the conditions of this resource consent during the previous 12 months, shall be supplied to the Council's Environmental Compliance Manager by 31 August each year. The summary of results shall include an analysis of any trends in the monitoring results.

Treatment System Failure

17. The consent holder shall notify, in the event of any treatment system failure which may cause a public health nuisance or risk, or the discharge of wastes to areas other than the disposal field, without undue delay, both the Medical Officer of Health (or Health Protection Officer) and the Council's Environmental Compliance Manager, as appropriate.

Administration Conditions

18. (a) The consent holder shall prepare an irrigation management plan that details the procedures to be put in place to irrigate wastewater in compliance with the conditions of this resource consent to minimise the potential for adverse effects due to the discharge. A copy of the plan shall be submitted to the Council's Environmental Compliance Manager by 31 August 2003 and any revisions to the plan during the term

Environment Southland is the brand name of
the Southland Regional Council

of this consent shall be forwarded to the manager before any changes are implemented.

- (b) The consent holder shall implement and maintain a system to identify and record the irrigator locations, and the period of irrigation, each day. A copy of this information is to be supplied to Environment Southland's Compliance Manager, or delegate, upon request.
19. The consent holder shall pay an annual administration charge to the Southland Regional Council, collected in accordance with Section 36 of the Resource Management Act, payable in advance on the first day of July each year. The charge shall include the cost of two inspections of the effluent discharge area by Council officers each year.
20. The Southland Regional Council may serve notice, as a result of information received, in accordance with the conditions of this permit, and in accordance with Sections 128 and 129 of the Act, in the period May to September each year, of its intention to review the conditions of the consent for the purposes of:
- (i) dealing with any adverse or cumulative effects on the environment which may arise from the exercise of this consent;
 - (ii) addressing monitoring requirements;
 - (iii) addressing odour, groundwater contamination or wastewater seepage into tile drains, or
 - (iv) complying with the requirements of a regional plan.
21. The consent holder may apply to the Council for the change or cancellation of any of the conditions of this consent, other than Condition 1, in accordance with Section 127 of the Resource Management Act, during the period May to September each year.

Further Investigation and Limit Conditions

22. The consent holder shall carry out a review of the wastewater irrigation system and area to identify measures, and set out a timeframe for implementation of those measures, to avoid or mitigate the discharge of wastewater into surface water bodies via tile drains, bypass flow or run-off/overland flow. The review shall conform to the following:
- (a) the review is to be carried out or reviewed by a suitably qualified person and shall include, but is not limited to:
 - identification and mapping of tile drains in the wastewater irrigation area. The positions of the drains are to be identified by GPS co ordinates, accurate to the nearest metre. The drain positions are to be provided in New Zealand map grid co-ordinates;
 - measures to minimise wastewater production;
 - measures to defer wastewater irrigation when soils are at field capacity, such as storage of wastewater;
 - measures to match wastewater irrigation with soil moisture deficit;
 - recommendations for monitoring and control mechanisms to support and check the mitigation measures.
 - (b) the review is to be completed and reported to Environment Southland's Compliance Manager by 3 December 2012.

Environment Southland is the brand name of
the Southland Regional Council

23. By 3 December 2012, the consent holder shall provide to Environment Southland's Compliance Manager, an A3-size aerial photograph of the wastewater irrigation areas, at a scale of 1:10,000 or less, showing the soil types identified in condition 4(d).
24. Beyond a zone of reasonable mixing in the unnamed tributary of the south branch of the Waihopai River:
- (a) the standards for Lowland Hard Bed waterbodies, as shown in Appendix A, shall apply and be maintained with respect to the effect of any discharge made pursuant to this consent;
 - (b) there shall be no production of any conspicuous oil or grease films, scums, foams, floatable or suspended materials, nor any conspicuous change in colour, in the tributary as a result of any discharge made pursuant to this consent;
 - (c) there shall be no emission of objectionable odour from the tributary as a result of any discharge made pursuant to this consent
25. The consent holder shall by 31 March 2019, supply to Environment Southland's Compliance Manager an updated Irrigation Management Plan to incorporate the additional discharge area. The irrigation Management Plan update is to be carried out or reviewed by a suitably qualified person and shall include;
- (a) identification and mapping of tile drains in the new wastewater irrigation area. The positions of the drains are to be identified by GPS co-ordinates accurate to the nearest metre. The drain positions are to be provided in New Zealand map grid coordinates.
 - (b) An A3-size aerial photograph of the wastewater irrigation areas at a scale of 1:10,000 or less, showing the soil types identified in condition 4(d)

Reissued 22 November 2018 following variations to the legal descriptions, Schedule 1 and the addition of Condition 25.

for the Southland Regional Council



Joanna Gilroy
Team Leader Consents

Environment Southland is the brand name of
the Southland Regional Council

Schedule 1 – Legal Description of the Land

The legal description of the land that may be irrigated pursuant to this permit is as follows:

1. Lot 1 DP 595 and Part Lots 7 & 8 DP 159 being part Section 42 Block VIII Lothian Hundred.
2. Lots 9, 12 and 13 DP 159 and Lots 292 and 293 DP 155 being Section 42 Block VIII Lothian Hundred.
3. Lot 1 DP 12016 being part Section 12 Block VIII Lothian Hundred.
4. Lot 1 DP 8287

Appendix A Standards for Lowland Hard Bed Waterbodies

The temperature of the water:

- shall not exceed 23°C;
- shall not exceed 11°C in trout spawning areas during May to September inclusive;
- the daily maximum ambient water temperature shall not be increased by more than 3°C when the natural or existing water temperature is 16°C or less, as a result of any discharge. If the natural or existing water temperature is above 16°C, the natural or existing water temperature shall not be exceeded by more than 1°C as a result of any discharge.

The pH of the water shall be within the range 6.5 to 9, and there shall be no pH change in water due to a discharge that results in a loss of biological diversity or a change in community composition.

The concentration of dissolved oxygen in water shall exceed 80% of saturation concentration.

There shall be no bacterial or fungal slime growths visible to the naked eye as obvious plumose growths or mats. *(Note: This standard also applies to within the zone of reasonable mixing for a discharge.)*

When the flow is below the median flow, the visual clarity of the water shall not be less than 1.6 metres, except where the water is naturally low in clarity as a result of high concentrations of tannins, in which case the natural colour and clarity shall not be altered.²

The concentration of total ammonia shall not exceed the values specified in Table 1 "Ammonia standards for Lowland and Hill surface water bodies".

The concentration of faecal coliforms shall not exceed 1,000 coliforms per 100 millilitres, except for popular bathing sites, defined in Appendix K "Popular Bathing Sites" of the Regional Water Plan, and within 1 km immediately upstream of these sites, where the concentration of *Escherichia coli* shall not exceed 130 *E. coli* per 100 millilitres.

² Visual clarity is assessed using the black disc method or other comparable method employed by Environment Southland.
Environment Southland is the brand name of the Southland Regional Council

Appendix 2 – Resource Consent AUTH-201193-V5



AUTH-201193-V5

Cnr North Road and Price Street
(Private Bag 90116)
Invercargill

Telephone (03) 211 5115
Fax No. (03) 211 5252
Southland Freephone No. 0800 76 88 45

Air Discharge Permit

Pursuant to Section 105(1) of the Resource Management Act 1991, a resource consent is hereby granted by the Southland Regional Council to **Blue Sky Meats (NZ) Ltd** (the "consent holder") of **Morton Mains, R D 1, Invercargill** from 23 May 2003.

Please read this Consent carefully, and ensure that any staff or contractors carrying out activities under this Consent on your behalf are aware of all the conditions of the Consent.

Details of Permit

Purpose for which permit is granted: To discharge contaminants to the air from a meat processing plant, rendering and blood drying plant and associated boilers

Location - site locality Morton Mains
- map reference F46:745:195
- receiving environment Air

Legal description of land at the site: Lot 1 DP 595 and Pt Lots 7 & 8 DP 159 being Pt Sec 42 Blk VIII Lothian HD; Lots 9, 12 and 13 DP 159 and Lots 292 and 293 DP 155 being Sec 42 Blk VIII Lothian HD; Lot 1 DP 12016 being Pt Sec 12 Blk VIII Lothian HD; Lot 1 DP 8287 and Lot 1 DP 12194

History of Amendments: Conditions amended on 22 April 2009, 8 June 2015, and 30 March 2016 as follows.
Consent varied on 22 November 2018.
Conditions amended on 28 February 2019

Expiry date: 31 December 2022

Environment Southland is the brand name of
the Southland Regional Council

Schedule of Conditions**General**

1. This resource consent shall expire on 31 December 2022.
2. This consent allows the discharge of contaminants from the applicant's industrial premises at Morton Mains from the following sources, as described in the original application; the variation application dated 5 March 2015 and further information dated 14 May 2015 and 27 May 2015, and the application for variation to the refrigerant system dated 13 December 2018, subject to the conditions set out in this document:
 - (a) A rendering plant processing up to 5,750 kg of raw material per hour;
 - (b) A blood processing and drying operation;
 - (c) A meat processing plant;
 - (d) Collection and treatment of wastewater from rendering and meat processing, until the date that the wastewater treatment system described in the 13 December 2018 application is commissioned;
 - (e) Irrigation onto land of up to 1000 cubic metres per day of wastewater;
 - (f) One 4.3 MW coal-fired boiler;
 - (g) One 2 MW coal-fired boiler;
 - (h) Offal pits;
 - (i) Salting shed

Boilers

3.
 - (a) The maximum coal burning rate in the 4.3MW boiler shall not exceed 1350 kilograms of coal per hour.
 - (b) The maximum coal burning rate in the 2MW boiler shall not exceed 630 kilograms of coal per hour.
4. The opacity of emissions from the chimney stacks of the coal-fired boilers shall not be darker than Ringelmann Shade 1 as described in New Zealand Standard 5201:1973 except:
 - (a) in the case of a cold start, for a period not exceeding 30 minutes in the first hour of operation; and
 - (b) for a period not exceeding a total of four minutes in each succeeding hour of operation.
5.
 - (a) The discharge into air from the 4.3MW boiler shall occur via a stack at a height of at least 20 metres above ground level and at least 9 metres above the roof ridgeline of any adjacent building.
 - (b) The discharge into air from the 2MW boiler shall occur via a stack at a height of at least 19 metres above ground level and at least 10 metres above the roof ridgeline of any adjacent building.

- (c) The discharges shall be directed vertically into air and shall not be impeded by any obstruction above the stack which decreases the vertical efflux velocity.
6. The sulphur content of a representative sample of the coal burned shall not exceed 0.5 percent by weight. The ash content of that sample shall be less than 7 percent by weight. The sample shall contain less than 30 percent by weight of fine particles having a diameter of less than 3.35 millimetres.
 7.
 - (a) The concentration of particulate matter in combustion gas discharged from the coal-fired boiler chimney stacks shall not exceed 500 milligrams per cubic metre adjusted to 0 degrees Celsius, dry gas basis, 101.3 kilopascals, and 8 percent oxygen or 12 percent carbon dioxide.
 - (b) Any measurement to confirm compliance with the particulate concentration limit shall occur when the tested boiler is operating at greater than 75 percent of the maximum continuous rating. The method of sampling and analysis shall comply with ISO 9096:1992(E), and may include methods BS 6069: 1992, ASTM D3685-78, ASTM D3685M-92, AS 4323.2-1995, US EPA Method 5, US EPA Method 17 or an equivalent method that complies with the fundamental sampling requirements of ISO 9096:1992(E).
 8. The boiler stacks shall be fitted with source emission test ports and safe access for testing, to the satisfaction of Environment Southland.
 9. The coal-fired boilers shall be serviced and maintained to ensure compliance with Conditions 4 and 7(a) at all times. Service reports shall be prepared and retained, and copies shall be provided to Environment Southland on request.

Rendering and Meat Processing

10.
 - (a) Only fresh raw material or suitably preserved material shall be processed in the rendering plant.
 - (b) Raw material for rendering shall not be held on-site for more than 24 hours.
 - (c) Suitably preserved material shall be material that is chilled or frozen and is derived from cutting, boning or further processing of animal tissue that has been chilled or frozen within 24 hours of the time of slaughter.
11. The air within the rendering plant building shall be maintained at negative pressure at all times during processing such that all ventilation air is discharged via a biofilter, as described in the application.
12. The rendering plant biofilter shall be capable of treating at least 12 air changes per hour and shall contain filter media to a depth of at least 1 metre. Design plans of the biofilter shall be provided to Environment Southland for approval, prior to construction.

13. Processing areas, collection sumps and traps in the meat processing plant and rendering plant shall be cleaned at least daily to minimise odour emissions.

Wastewater Treatment and Irrigation

14. (a) Wastewater shall be maintained in an aerobic condition using two Apex 45 aerators in order to minimise odour, as described in the application to vary the consent lodged on 1 March 2016. Wastewater shall not be held in the storage pond for a continuous period of more than 2 days unless aerated to avoid the onset of anaerobic conditions.
- (b) The consent holder shall notify the consent authority in writing (email: escompliance@es.govt.nz) upon commission of the wastewater treatment system described in the resource consent application dated 13 December 2018
- (c) Condition 14(a) shall cease to have effect from the date that the wastewater treatment system is commissioned, and after that date the emissions from the treatment and storage of wastewater on the site shall be authorised under Resource Consent AUTH-20181937-04, or other rule or resource consent.
15. Wastewater shall not be irrigated onto land within 20 metres of any property boundary. There shall be no spray drift beyond that property boundary.

Site Management Plan

16. Management Plan:
- (a) By the 31st of December 2015, an updated site management plan shall be prepared and provided to the Consent Authority for approval. This management plan shall detail all actions to be taken to minimise odour and particulate matter emissions from the plant and to ensure compliance with the conditions of this consent. The plan shall address:
- (i) Wastewater collection and treatment, including maximum holding times;
 - (ii) Wastewater irrigation procedures and minimum setback distances; and
 - (iii) Boiler plant maintenance.
- (b) Within three months of commissioning of the rendering plant, an update of the plan shall be submitted to the Council's Manager of Environmental Compliance. The update shall include the above matters and the following:
- (i) Biofilter maintenance requirements;
 - (ii) Operating procedures to minimise odour emissions from the rendering and blood-drying plant.
- (c) The management plan shall state the name and contact telephone number of all persons responsible for each action described in the plan and shall be updated at

least annually to include staff changes. The plan shall be available for inspection at the consent holder's property at all times.

Odour Conditions

17. The discharges shall not cause odour that is offensive or objectionable to such an extent that it has an adverse effect on the environment beyond the boundary of the property on which the consent is exercised.
18. A record of any complaints relating to odour shall be kept, and shall include:
 - (a) the location where the effect was detected by the complainant;
 - (b) the date and time when the effect was detected;
 - (c) a description of the wind speed and wind direction when the effect was detected by the complainant;
 - (d) the most likely cause of the effect detected; and
 - (e) any corrective action undertaken by the consent holder to avoid, remedy or mitigate the effect detected by the complainant.

This record shall be provided to Environment Southland annually and otherwise on request.

19. Should, in the opinion of the Council's Manager of Environmental Compliance, odour complaint records indicate that discharges from the consent holder's activities are causing odour nuisance, the consent holder shall instigate a systematic odour diary programme during the subsequent year to establish the characteristics of odour impacts caused by the discharges. The design of the odour diary programme shall be in accordance with recognised good practice and shall be to the satisfaction of Environment Southland. Results of the odour diary programme shall be reported to Environment Southland within two months of completion of the programme. The report shall include an assessment of the need for mitigation of any adverse effects identified.

Administration Conditions

20. The consent holder shall pay an annual administration charge to the Southland Regional Council, collected in accordance with Section 36 of the Resource Management Act, payable in advance on the first day of July each year. The charge shall include the cost of two inspections of the effluent discharge area by Council officers each year.
21. The Southland Regional Council may serve notice, as a result of information received, in accordance with the conditions of this permit, and in accordance with Sections 128 and 129 of the Act, in the period May to September each year, of its intention to review the conditions of the consent for the purposes of:
 - (i) dealing with any adverse or cumulative effects on the environment which may arise from the exercise of this consent;

- (ii) addressing monitoring requirements; or
- (iii) complying with the requirements of a regional plan.

22. The consent holder may apply to the Council for the change or cancellation of any of the conditions of this consent, other than Condition 1, in accordance with Section 127 of the Resource Management Act, during the period May to September each year.

Reissued 28 February 2019 after changes to Condition 2

for the **Southland Regional Council**



Aurora Grant
Consents Manager

Appendix 3 – BSM0-03: Reporting Lines

BSM003

BLUE SKY MEATS – REPORTING LINES

The following reporting is to be undertaken in the event of an environmental non-compliance event or near miss event. If you are unsure if it needs to be reported please discuss it with your manager. If your direct manager is not available, please inform the next level manager (as outlined in table 1 below).

- 1. Major Incident –** Notify your manager within 20 minutes, complete your section of the incident investigation form ASAP (once steps to mitigate have been undertaken):
- a. Wastewater reached a title drain, open drain or waterway.
 - b. Severe wastewater pooling in the paddock (<6m²)
- 2. Mid Incident –** Notify your manager within 1 hour, complete your section of the incident Investigation Form ASAP (once steps to mitigate have been undertaken):
- a. Moderate wastewater pooling in the paddock (>3m²)
- 3. Minor Incident –** Notify your manager the same day and complete a take 5 on the daily recording sheet:
- a. Any effluent was discharged without the proper nozzle size, through a hose, or through a split in the hose.
 - b. Minor wastewater pooling in paddock (<3m²)
- Equipment Failure –** Notify the Engineering Manager within 30 minutes of finding the failure. Notify your manager the same day and complete a take 5 on the daily recording sheet. Do not use again until fully repaired:
- a. Split in hose
 - b. Broken equipment
 - c. Pump issues or any mechanical issues
- Pond >75% full –** Notify your manager.
- IT Failure –** Notify IT Manager within 30 minutes of an issue being found.
- a. Event-based login not working.
 - B. Your password not working.

If your manager is not available, please escalate up the list in Table 1 below until you get a reply.

Notification for Incidents above	Position	Name	Mobile	Email
1	CEO – Chief Executive	Arron Hoyle	0211161059	arron@bluesky.co.nz
1, 2	General Manager Operations	Steve Paynter	0272555191	steve@bluesky.co.nz
1,2,	Plant Manager	Jason O'Connell	0272675499	jason.oconnell@bluesky.co.nz
1,2,3,4,5,6	By Products & Effluent Farms Manager	Karl Evans	TBC	karl.evans@bluesky.co.nz
4	Engineering Manager	TBC	TBC	TBC
6	IT Manager	TBC	TBC	TBC

Table 1 Notification Levels

Appendix 4 – BSM006: Incident Investigation Form

BSM006 Incident Investigation Form V3

BLUE SKY MEATS INCIDENT INVESTIGATION FORM

To be completed for each incident that results in ponding, pooling or runoff.

The incident response process is as follows:

Detect	Incident
Respond	Stop: Incident getting worse Inform: Your manager (if they are not available escalate response to other managers noted in BSM003 – Reporting Lines (Table 1) Prevent: Any surface flow or tile flow pathways to water Mitigate: Reduce the effects, e.g. pump spill back to pond or to another area, spread out. Move: The system, do not operate near this area again
Photos	Take sufficient photos of the incident prior to and post corrective action – photos should capture incident from all angles and distance
Monitor	The incident area continually for a minimum period of 48hrs after the effects have stopped.
Trackback	Identify what happened, what caused the incident. Repair/replace/train before using system again
Take Ten	Report Complete this incident Response Form. Give to your manager
Post Mortem	Discuss incident with your manager. Evaluate what happened and will it happen again
Initiate	Follow up actions and record

Employee name that discovered incident: _____

Manager informed of incident: _____

Employee Section - Take ten minutes to complete - it's not about quantity- important details- brief notes please see Environmental Officer (if not available GM or CEO).

Brief notes	Date:	Employee
Detect		
What was happening?		
What effect where rated?		
Was anyone Injured? If yes where and how ?		
Other relevant details / people involved:		
Response		
What actions did you make upon finding the incident?		
How was the incident stopped/ contained/ blocked/ reduced/ pumped/ etc.?		
What actions were taken to ensure the incident would not continue?		
What steps do you think could stop this incident occurring again?		
Monitor		
How will you monitor the incident *		

Once you have completed this section, please give It directly to the Environmental Officer, GM, CEO (depending upon availability) and email/text photos to Environmental Officer.

Mangers Section

Brief Notes (attached separate paper if needed)	Dates:	Signature:
Trackback		
Was there sufficient wastewater ponding or running off to dig a hole, capture and suck up the spill? YES / NO Was a slurry tanker called as soon as the incident was discovered?		
Was external advice sought in relation to the incident? YES / NO What response actions did they suggest? Where these actions undertaken? YES / NO If not why not?		
Was ES notified of the incident? YES / NO What response actions did they recommend? Where these actions undertaken? If not why not?		
What was the soil saturation level for the week prior to the incident?		
What volume of effluent was applied to this area for the previous 3 days?		
What was the conductivity readings for the 3 days prior and 7 days after the incident?		
What were the main factors that caused the Incident?		

Brief Notes	Dates:	Signature:
Was this incident due to a system/infrastructure problem, a person/training both? Why?		
Other details:		
Post Mortem		
What could have been done differently (in hindsight)?		
What steps/actions/processes/ training/ system changes are to be taken to ensure this does not happen again?		
Who is going to undertake the steps/actions/processes/ training/ system changes, identified above?		
Other details:		

Initiate				Date:	Signature:
What follow up actions are proposed?					
Hourly Monitoring	Twice Daily	Daily	Weekly		
Until	Until	Until	Until		
Twice daily slurry tanker and applied back to land	Daily slurry tanker and apply back to land				
Until	Until	Until	Until		
Were photos of the incident and response taken throughout the whole process? YES / NO If yes, please email to Environmental Officer.					
How long will actions and monitoring remain in place?					
This report, photos and the Blue Sky Meats Wastewater Incident Response flow diagram sheet have been sent to / hand delivered to: Environmental Officer, Farm and Effluent Manager, GM, CEO					

Appendix 5 – BSM009: Complaints Register

Blue Sky Meats (NZ) Ltd Complaints Register.

BSM009 Compliants Register V2 - FEB 2018

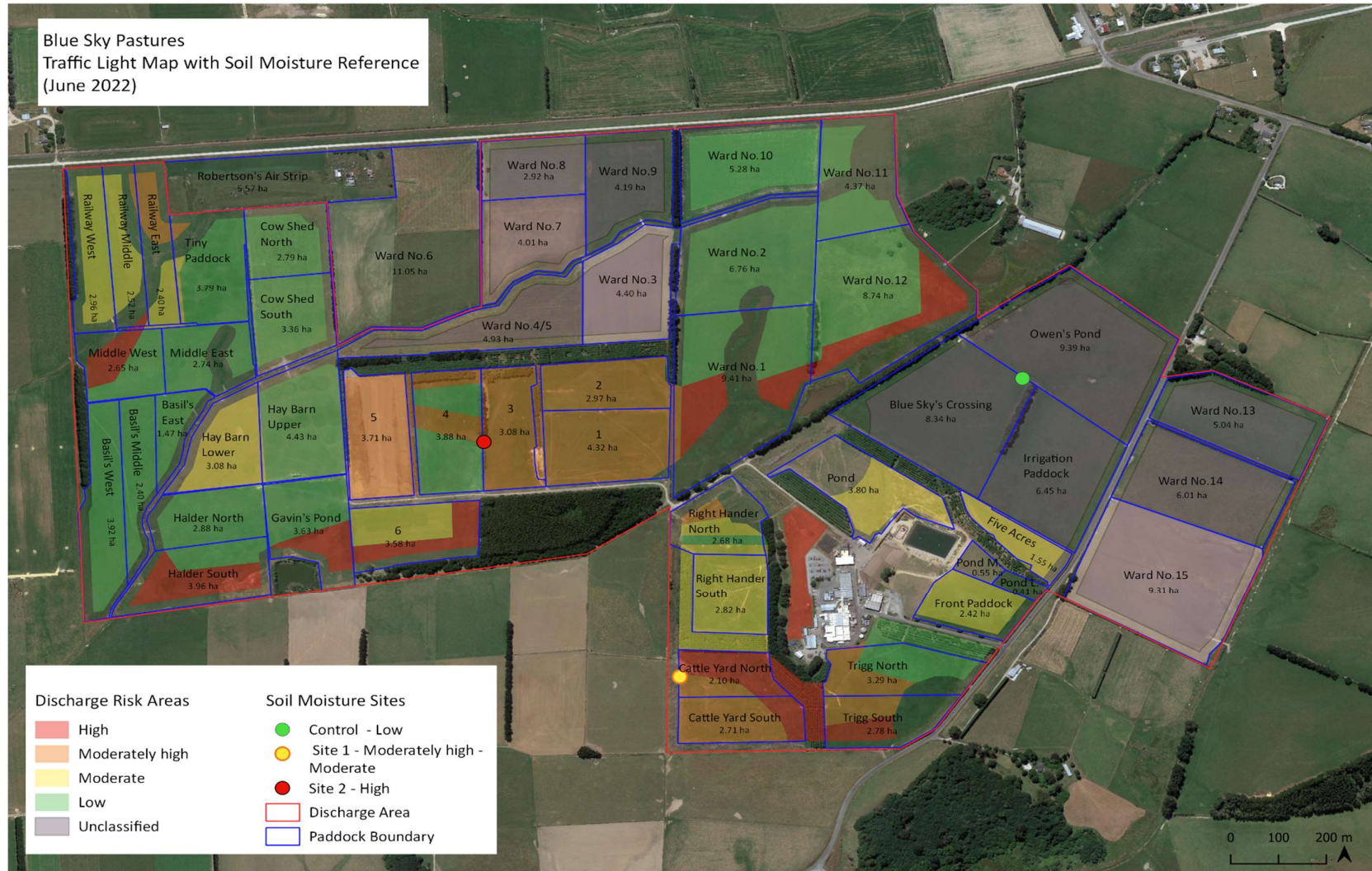
To be filled in and investigated immediately (within 3 hours for receiving). Results reported to GM.

Purpose: to record every occurrence of a complaint, both official and unofficial, to ensure compliance with all health and environmental requirements.

This register should act as a summary document with a more detailed history contained in the complaints file.

Reference Number	Date	Time	Complaint taken by	Referred internal to	Referred external to	GM notified/ time date	Person Allocated Responsibility	Status
Details of Complaint:								
Actions Undertaken:								

Appendix 6 – BSM013: Traffic Light Map

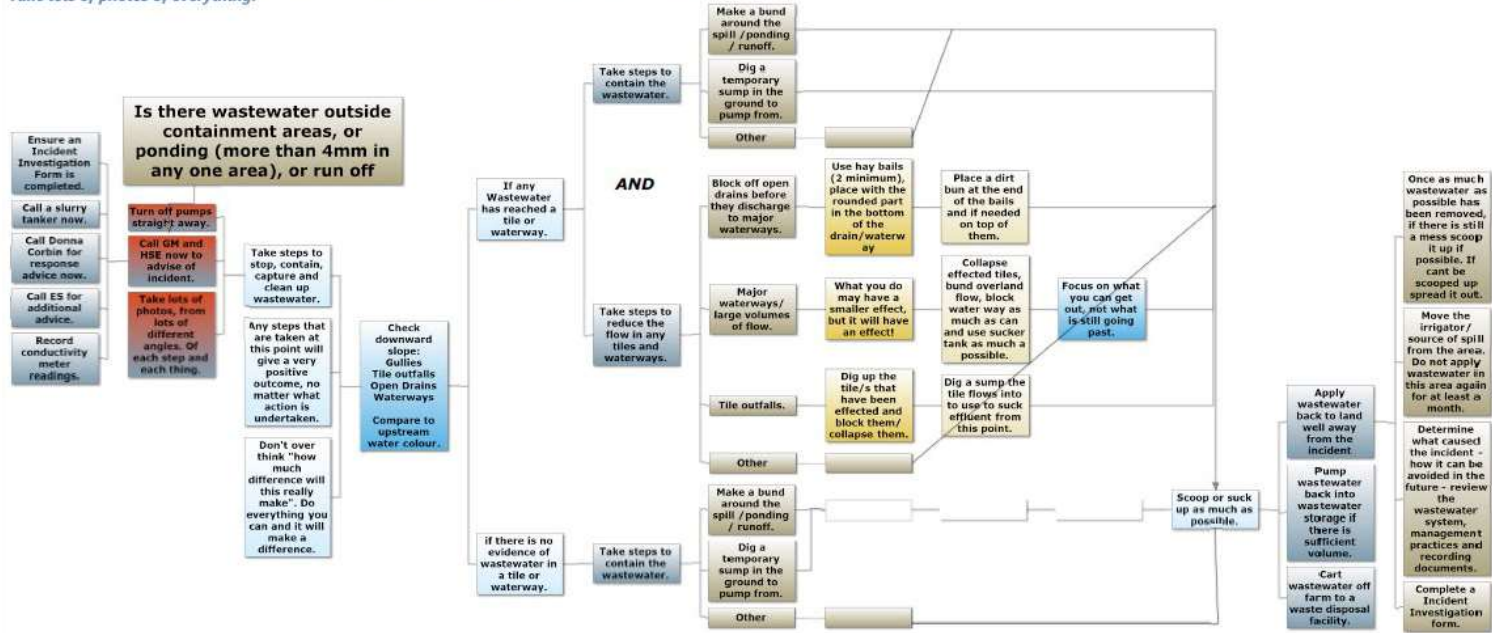


Appendix 7 – BSM015: Incident Response Wall Chart

Blue Sky Pastures Wastewater Incident Response

V4 - Feb2021

This flow diagram should be completed for any incident that results in ponding, pooling or runoff of effluent, regardless of seriousness of incident.
 Cross off any actions not taken, add a note as to why not, circle any steps taken and add notes.
 Take lots of photos of everything!



The more of the above steps you take the better the outcome. You are in control of how much you do from here.

Notes on steps not undertaken (why not):

Notes on steps undertaken:

.....

.....

.....

.....

.....

.....

.....

Emergency Numbers:
 Refer to Reporting Lines BSM003 for GM, HSE and SS

- Donna Corbin - 027 890 1234
- Environment Southland - 03 2115 115
- Slurry Tankers - Caldwells - 027 436 4663
- Thompsons - 027 439 2842

A copy of this form is to be given to the Health Safety and Environment Manager for each incident, regardless of the seriousness of the incident. A copy is also to be placed in the Incident Folder that is to be kept in control office.

Appendix 8 - BSM017: Application Timing

Blue Sky Pasture (NZ) Limited

BSM017 Application Timing V3 -SEPT2022.docx

Measured Application Rates / Depths

- Pods
 - Approximately 6 mm / hour of pumping;
 - Approximately 16.5 m³ / hour of pumping; and
 - Approximately 5 hours of pump time to reach 30 mm total depth.

Pods

	Approximate, average depth applied for hours of pumping, with a minimum of 31psi.								
	1.0 hr	1.5 hr	2.0 hr	2.5 hr	3.0 hr	3.5 hr	4.0 hr	4.5 hr	5.0 hr
Pods	6mm	9mm	12mm	15mm	18mm	21mm	24mm	27mm	30mm

To assist in the compliance of AUTH 201191 – V1 an automated system called Irrigator has been installed and tracks and ensures compliance by limiting run time of the pods, application volume of wastewater and return periods to ensure compliance.

Appendix 9 – BSM018: Personal Training Record

BSM018 Personal Training Record V2- OCT2018

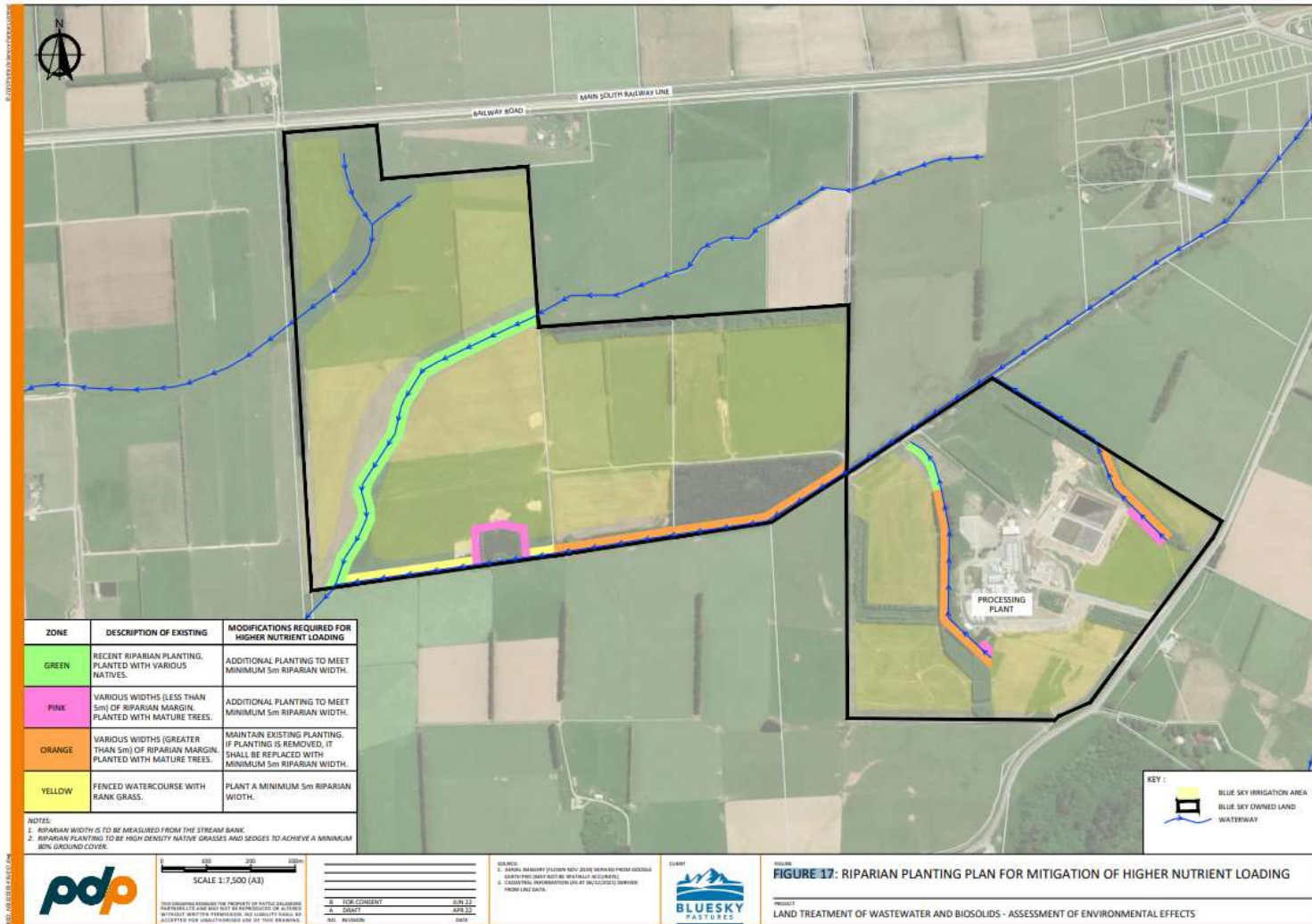
Blue Sky Pastures Wastewater Training Record

Training Name:

Position:

Doc Ref	Procedure:	Date	Trainer Signature	Trainee Signature	Confident		Notes
					Yes	No	
BSM018	Personal Training Record						
	Documents, Consents and Regulations						
	Introduction to the RMA and responsibilities.						
BSM001	Discharge Permit AUTH-201191						
BSM002	Discharge Area Map with set backs and tiles						
BSM003	Reporting Lines						
BSM005	Shift Run Sheet						
	On Farm:						
BSM017	Application Timing						
BSM013	Traffic Light Map with Soil Moisture areas						
BSM019	Harvest Overview						
BSM020	Alarm, Manual Override and Storing Protocol						
	Incident Response:						
BSM009	Complaints Register						
BSM011	Conductivity Alert Log						
BSM006	Incident Investigation Form						
BSM015	Incident Response Wall Chart						
	Other:						
	Blue Sky Pastures - Wastewater Treatment Plant Operation and Maintenance Manual (PDP)						

Appendix 10 – Riparian Planting Plan





APPENDIX H

Blue Sky Meats Wastewater
Treatment Plant Operation and
Maintenance Manual

BLUESKY

PASTURES

Blue Sky Pastures – Wastewater Treatment Plant Operation and Maintenance Manual



PATTLE DELAMORE PARTNERS LTD
Level 5, PDP House
235 Broadway, Newmarket, Auckland 1023
PO Box 9528, Auckland 1149, New Zealand

Tel +64 9 523 6900
Website <http://www.pdp.co.nz>



solutions for your environment

Quality Control Sheet

TITLE Blue Sky Pastures – Wastewater Treatment Plant Operation and Maintenance
Manual

CLIENT Blue Sky Pastures

VERSION Revision 3 - Track Changes Version

ISSUE DATE 20 June 2023

JOB A03220202_O&M_Manual_Rev3_2023.docx

REFERENCE

SOURCE A03220202_O&M_Manual_Rev3_2023.docx.

FILE(S)

DOCUMENT CONTRIBUTORS

Prepared by

SIGNATURE

Andrew Dean

Reviewed and Approved by

SIGNATURE

Azam Khan

Limitations:

This report has been prepared by Pattle Delamore Partners Limited (PDP) on the basis of information provided by Blue Sky Pastures and [others not directly contracted by PDP for the work, including EIS. PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the report. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

This report has been prepared by PDP on the specific instructions of Blue Sky Pastures. for the limited purposes described in the report. PDP accepts no liability if the report is used for a different purpose or if it is used or relied on by any other person. Any such use or reliance will be solely at their own risk.

Revision Record

Revision Record			
Revision	Revision Date	Description of Changes	Entered By
Draft	February 2020	Original document prepared by PDP	PDP
Revision 1	13 October 2020	Updated following ES review	PDP
Revision 2	16 March 2022	Updated personnel contact details	PDP
Revision 3	20 June 2023	Changes to reflect power outages and management of wastewater treatment system	PDP



BLUE SKY PASTURES – WASTEWATER TREATMENT PLANT OPERATION AND MAINTENANCE
MANUAL

Glossary

Glossary	
Ar	Argon
BOD	Biological Oxygen Demand
cBOD ₅	5-Day Carbonaceous Biochemical Oxygen Demand
CH ₄	Methane
CO ₂	Carbon Dioxide
DAF	Dissolved Air Flotation
DRP	Dissolved Reactive Phosphorus
<i>E. coli</i>	Escherichia coli
EC	Electrical Conductivity
H ₂ S	Hydrogen Sulphide
N ₂	Nitrogen
NO ₂ ⁻	Nitrite
NO ₃ ⁻	Nitrate
NH ₄ ⁺	Ammonium
NH ₄ -N	Ammoniacal Nitrogen
NO _x -N	Oxidised Nitrogen
NO ₂ -N	Nitrite Nitrogen
NO ₃ -N	Nitrate Nitrogen
TKN	Total Kjeldahl Nitrogen
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids
WAS	Waste Activated Sludge
MLSS	Mixed Liquor Suspended Solids
SBR	Sequencing Batch Reactor

Table of Contents

SECTION	PAGE	
1.0	Operation and Maintenance Manual Overview	1
1.1	Introduction	1
1.2	Purpose and Scope	1
1.3	Review of the O&M Manual	2
1.4	Roles and Responsibilities	2
2.0	Health and Safety	4
2.1	General	4
2.2	Personal Protective Equipment (PPE) on WWTP Site	4
2.3	Flow Equalisation Basin	4
2.4	Anaerobic Lagoon	4
2.5	Sequencing Batch Reactor (SBR) Lagoon	5
2.6	Irrigation Lagoon	5
2.7	Wastewater Contact	6
2.8	Hazardous Gases	6
2.9	Chemical Handling	6
2.10	Electrical Systems	7
2.11	Biogas Treatment System	7
2.12	Hot Work	8
2.13	Confined Space Entry	8
3.0	Wastewater Treatment Plant Process Summary	9
3.1	Treatment System Description	9
3.2	Wastewater Sources	12
3.3	Flow Equalisation Basin	12
3.4	Anaerobic Lagoon	12
3.5	Sequencing Batch Reactor	12
3.6	Irrigation Storage Lagoon	13
3.7	Discharge	13
3.8	Biogas Management	13
3.9	Rainwater Management	14
3.10	Groundwater Management	14
3.11	Solids Management	15
3.12	Treatment System Instrumentation Controls	16
4.0	WWTP Operation	23
4.1	Overview	23
4.2	Management of Wastewater Contaminants	23
4.3	Odour Management	26
4.4	Summary of Operational Limits	27
5.0	Plant Maintenance	28

5.1	Supplier Documentation and General	28
5.2	Pipework and Valves	30
5.3	Pumps	30
5.4	Instrumentation	30
5.5	Lift Pump Station Maintenance	30
5.6	Flow Equalisation Basin	30
5.7	Anaerobic Lagoon Maintenance	31
5.8	SBR Lagoon	31
5.9	Biogas Treatment	31
5.10	Daily O&M Checklist	32
5.11	Routine Maintenance Schedule Summary	32
6.0	Contingency, Response and Troubleshooting	32
7.0	Monitoring	39
7.1	Treated Effluent Consent Limits	39
7.2	Groundwater and Surface Water Sampling	40
7.3	Other Monitoring Requirements	41
8.0	Nuisances and Complaints	44
8.1	Odours and Spray Drift	44
8.2	Noise	44
8.3	Pests and Vermin	44
8.4	Recording of Nuisances and Complaints	45
9.0	Notification of Non-Compliance	45
10.0	Reporting and Record Keeping	46
10.1	Routine Maintenance and Repairs	46
10.2	Monitoring Data	46

Table of Figures

Figure 1 - WWTP General Layout	10
Figure 2 - WWTP P&ID	11
Figure 3 - Main HMI Display	17
Figure 4 - HMI Setpoints Screen	18
Figure 5 - HMI Reports Screen	19

Table of Tables

Table 1: WWTP Roles and Contacts	3
Table 2: SBR Phasing	20
Table 3: Level and Flow Control Setpoints	22
Table 4: Process Operational Criteria	27
Table 5: Supplier Documentation List	29
Table 6: Contingency and Response Procedures	33
Table 7: Key Resource Consent Requirements	39
Table 8: Treated Effluent Sampling Parameters	40
Table 9: Groundwater and Surface Water Sampling Parameters	41
Table 10: Monitoring of WWTP Parameters for Effective WWTP Operation	42

Appendices

Appendix A: WWTP Functional Description
Appendix B: EIS WWTP HMI Manual
Appendix C: Daily Operation & Maintenance Checklist
Appendix D: WWTP General Maintenance Schedule Summary
Appendix E: Complaint Form
Appendix F: Relevant Resource Consents

1.0 Operation and Maintenance Manual Overview

1.1 Introduction

Blue Sky Pastures (BSP) owns and operates a lamb and sheep processing and ancillary meat rendering plant in Morton Mains, Southland. BSP also operates the biological wastewater treatment plant (WWTP) on the same site, constructed in 2019. The WWTP treats primary slaughterhouse and rendering wastewater prior to irrigation to land.

BSP presently hold Environment Southland Resource Consent 201191 for the discharge of meat processing and rendering plant wastewater to land via spray irrigation. This consent will expire on 31 December 2022.

The WWTP must be well managed so that the treated effluent quality remains within the limits set out in Resource Consent 201191.

BSP hold other resource consents from Environment Southland (ES) associated with the operation of the WWTP, including a land use consent and a consent for the discharge of land drainage water and stormwater to surface water.

1.2 Purpose and Scope

The purpose of this Operation and Maintenance (O&M) Manual is to describe the procedures for:

- Safe and effective operation of the BSP WWTP and,
- To maintain compliance with the conditions of the Resource Consents associated with the WWTP.

This document is intended to be used by the plant operators to assist with general plant operation. Notwithstanding, this document can only detail foreseen events. If systems are not operating as expected, then professional assistance shall be sought.

Operators shall familiarise themselves with the conditions of the Resource Consents and the requirements to maintain compliance.

The scope of this O&M Manual is to provide guidance on:

- a.) Key Health and Safety (H&S) considerations related to the WWTP operation.
- b.) Day-to-day treatment system operational, maintenance and management procedures.
- c.) How treatment systems will be optimised to remove nutrients (principally nitrogen) and BOD.
- d.) Odour reduction and minimisation procedures.

- e.) O&M of various mechanical equipment.
- f.) Wasting of waste activated sludge (WAS).
- g.) Emergency measures and procedures for uncommon events.

1.3 Review of the O&M Manual

This document shall be periodically reviewed and updated by BSP to ensure that it continues to provide an up-to-date reference of O&M procedures.

Any changes shall be recorded in the revision record section at the beginning of the document. This O&M Manual is to be reviewed annually in accordance with Condition 10 of Resource Consent AUTH-20181937-01.

1.4 Roles and Responsibilities

The key personnel responsible for the O&M of the WWTP are detailed in Table 1. The key roles and responsibilities include but are not limited to the following:

1.4.1 General Manager Operations

- Overall responsibility for operations at the Morton Mains site.
- Engagement of Wastewater Technical Experts, as required.

1.4.2 WWTP Engineer/Manager

- Overall responsibility for operation of the WWTP.
- Overseeing O&M of the WWTP.
- Engagement and Liaison with the Wastewater Technical Experts.

1.4.3 Health Safety Environment Manager

- Responsible for the site's environmental performance and for ensuring compliance with the site's Resource Consent conditions.
- Liaising with ES and the local community on environmental matters.
- Responding to and reporting on odour complaints.

1.4.4 Operations Manager/ WWTP Operators

- Operate and monitor the wastewater and odour control systems.
- Identify maintenance requirements to minimise waste and odour emissions.
- Liaising with the Wastewater Technical Experts.
- Operational and environmental matters.
- Staff training.

1.4.5 Wastewater Technical Expert¹

- Assist with operation of the wastewater system via the available monitoring tools.
- Providing advice and assistance with the WWTP operation.
- Providing troubleshooting guidance.
- Providing advice to and assisting the WWTP Engineer with environmental issues.
- Assistance with reporting to ES on environmental matters.
- Reviewing and updating this manual.

1.4.6 All Site Employees

- Adhere to BSP’s environmental policies and procedures relevant to his or her area of work.
- Minimise waste and discharges to the environment by all practicable means.
- Advise WWTP Engineer of all operational issues, plant or equipment failures, or newly identified H&S hazards.

Table 1: WWTP Roles and Contacts		
Role	Name	Contact Phone Number
General Manager Operations	Jason O’Connell	027 267 0621
WWTP Engineer/Manager	John Patrick	027 223 1135
Health Safety Environment Manager	Paulus Smith	027 598 5595
Key Plant Operators	Peter Bain	027 549 8152
	Stu Graham	
	Wayne Jones	027 239 4779
Wastewater Technical Experts	Azam Khan	021 608 198
	Daryl Irvine	021 524 326
Environment Southland		0800 76 88 45

¹ Wastewater Technical Experts are PDP Engineers or other suitably qualified experts not employed directly by BSP. Technical Experts are to be engaged/utilised on an as-required basis with the approval of the General Manager Operations or WWTP Engineer.

2.0 Health and Safety

2.1 General

Work practices at the site shall comply with all regulations set out under the Health and Safety at Work Act 2015 (HSWA). Additionally, the BSP H&S Policy for the site shall apply at all times.

The key hazards associated with the operation of the WWTP are discussed in the following sections.

2.2 Personal Protective Equipment (PPE) on WWTP Site

The following PPE shall be worn at all times when working on the WWTP site:

1. Safety boots.
2. Hi-vis clothing/overalls.
3. Safety glasses.

Please note that specific actions and activities will have further PPE requirements as outlined by the site H&S plan and specific sections below.

2.3 Flow Equalisation Basin

All invasive works associated with the Flow Equalisation Basin (excavations, maintenance of pipework, maintenance of concrete chamber) requires a Permit to Work, issued by the Health Safety Environment Manager which must cover the specific hazards, risks and mitigation measures relevant to the activity.

The clay-lined Flow Equalisation Basin contains raw wastewater from the plant and like the other lagoons, is potentially a significant hazard. WWTP Operators must stay at least 1.5 m clear from the embankment edge at times without a permit to work.

Occasionally, and as wastewater loads increase to the plant, a thick crust can build up on the water surface of the Flow Equalisation Basin which, depending on the level of wastewater, can appear to be a solid surface. It is imperative that appropriate controls are in place to safeguard personnel access to the Flow Equalisation Basin.

2.4 Anaerobic Lagoon

All work on the Anaerobic Lagoon and associated biogas collection systems requires a Permit to Work, issued by the Health Safety Environment Manager which must cover the specific hazards, risks and mitigation measures relevant to the activity.

H&S procedures for the Anaerobic Lagoon:

1. Ensure the lagoon areas remain closed to all personnel except authorised operators and contractors.
2. Be cautious when walking on the cover. Access shall be limited to float supported areas **ONLY**.
3. Personnel walking out on unsupported sections of the Anaerobic Lagoon cover must be harnessed to the lagoon embankments. A spotter person must always be present on the embankment.
4. Take extreme care when opening access hatches as toxic and explosive gases are likely to be present, including methane and hydrogen sulfide gas. Allow sufficient time for the hatch to vent before working near the hatch. There shall be no naked flames or electrical equipment which is not intrinsically safe allowed near open hatch vents (see Section 2.11).
5. Only one person (harnessed at all times) shall stand next to an open Anaerobic Lagoon cover hatch. For specific tasks, a work plan must be prepared prior to having more than one person working at open hatches.

2.5 Sequencing Batch Reactor (SBR) Lagoon

The SBR Lagoon contains electrical/mechanical equipment including mixers, aerators, decanter and decant pump (P3). When working on or near the SBR Lagoon:

1. Machinery shall be manually deactivated at the Human Machine Interface (HMI) panel **and** isolated at the lagoon embankment.
2. The Otterdock Safe Docking Platform must always be used for safe access to the mixers and aerators.
3. **DO NOT** stand on the aerator/mixer pontoons.
4. For sludge (MLSS) settling tests, the Otterdock Platform must be used for sample collection.
5. Take care when walking near the lagoon to not step on the SBR liner as this can be slippery, particularly when accessing the level transmitters or pH and dissolved oxygen (DO) probes.

Gloves, safety glasses and a Personal Flotation Devices must be worn at all times when accessing the Otterdock Platform.

2.6 Irrigation Lagoon

The existing Irrigation Lagoon includes similar hazards to that of the Flow Equalisation Basin and the SBR lagoon, albeit the likelihood of a crust formation on the water surface is low.

Care shall be taken to not stand on the liner as it may be slippery.

WWTP Operators must stay at least 1.5 m clear from the embankment edge without a permit to work.

2.7 Wastewater Contact

Personnel shall avoid direct contact with the wastewater at all stages of the treatment process by using gloves and eye protection. Similarly, contact with wastewater spray shall be avoided where possible. If there is contact with wastewater, ensure that the affected area is washed thoroughly. If ingested, seek medical help.

2.8 Hazardous Gases

Hazardous gases such as methane and hydrogen sulphide may occur in any area where wastewater is contained or flowing. High risk locations where hazardous gas may occur include:

- Within the Lift Pump Station wetwell chamber.
- Within the cleanout pipe chambers on the central embankment.
- **Under the Anaerobic Lagoon cover.**
- Within the biogas pipework, flare and biofilter.
- **Within the wastewater transfer pipework riser.**
- Within all wastewater pipes and all other chambers.

Accessing any of the above areas requires a Permit to Work, issued by the Health Safety Environment Manager which must cover the specific hazards, risks and mitigation measures relevant to the activity.

Hazardous gases are particularly of concern in confined spaces. Confined Space Entry is discussed in Section 2.13.

2.9 Chemical Handling

The daily operation of the WWTP does not involve any direct chemical handling. Any chemical handling that is required, shall be done in accordance with the recommendations of the respective safety data sheet (SDS). Ensure that the SDS is read and understood prior to working with any chemicals.

Chemicals which may be used at the WWTP in the future may react with glove materials. Before handling chemicals or equipment, ensure the correct type of gloves are worn. Other forms of PPE, such as full cover safety glasses and overalls, are required.

2.10 Electrical Systems

All adjustments/alterations to any electrical equipment shall only be made by a Registered Electrician. All personnel shall employ general electrical safety, especially in, and around water. When carrying out maintenance and repair procedures on any electrical equipment, the equipment shall be deactivated via the local or plant HMI and shall be physically electrically isolated (switched OFF at the junction box). Any equipment that can impact safe maintenance/repair events (i.e. either in the vicinity or upstream) shall also be deactivated and isolated.

2.11 Biogas Treatment System

All invasive work on the Biogas Treatment System requires a Permit to Work, issued by the Health Safety Environment Manager which must cover the specific hazards, risks and mitigation measures relevant to the activity.

Biogas produced from the Anaerobic Lagoon is highly flammable and can be toxic even if a confined space is not present. This is due to the potential for the presence of poisonous and corrosive H₂S. Extreme care shall be taken when working on the gas collection and treatment system. At minimum this shall require two people and the use of a calibrated personal gas meter which requires specific training.

The cover hatches shall not be opened without conducting a safety assessment. Any work requiring the safety hatches to be opened shall be carried out during off-peak production, and the air around the hatch shall be tested with a gas meter prior to commencement and while the work is conducted.

There shall be no smoking, naked flames, sparks or ignition sources near the Anaerobic Lagoon. This includes any hot work of any nature. If hot work is required on the gas treatment system, the biogas blower shall be turned off and the inlet valves closed from the Anaerobic Lagoon for at least an hour prior to the start of any hot work. All pipe work shall be purged with inert gas (CO₂, N₂ or Ar) prior to any hot work on biogas lines.

When accessing any gas collection pipes or the Anaerobic Lagoon cover hatch, care shall be taken to ensure that there is adequate ventilation. The open hatch/pipe shall be left to disperse any retained biogas before any work commences.

The heat trace from the biogas flare can carry for a significant distance from the biogas flare (greater than 5 m) during strong winds. It is essential that the biogas flare is turned off prior to walking or working near the biogas flare or the corner of the SBR Lagoon closest to the biogas flare.

2.12 Hot Work

All hot work including welding, grinding or any other activity potentially generating flame, sparks or heat requires a Permit to Work, issued by the Health Safety Environment Manager which must cover the specific hazards, risks and mitigation measures relevant to the activity.

2.13 Confined Space Entry

All confined space work requires a Permit to Work, issued by the Health Safety Environment Manager which must cover the specific hazards, risks and mitigation measures relevant to the activity.

All areas on the site that are generally classified as a confined space shall be labelled as such, however, changing conditions may create confined spaces in other areas of the WWTP. Entry to a confined space must be avoided at all times where possible. If unavoidable in repair/maintenance events or emergencies, **only personnel with the relevant training and qualifications** shall enter the confined space. The training shall meet all requirements under Australian Standard: AS 2865 Confined Spaces.

All site H&S procedures relating to confined spaces shall be strictly followed.

3.0 Wastewater Treatment Plant Process Summary

3.1 Treatment System Description

The general layout of the WWTP is shown in Figure 1 and the plant Piping and Instrumentation Diagram (P&ID) is shown in Figure 2.

The process flow through the WWTP is briefly outlined as follows and further detail on the unit processes is outlined in the following sections:

- Wastewater from the slaughterhouse and rendering passes through a Contra-shear Milliscreen unit before entering the Flow Equalisation Basin.
- The Flow Equalisation Basin is hydraulically connected to the Lift Pump Station.
- Wastewater is pumped from the Lift Pump Station to the Anaerobic Lagoon.
- Wastewater then flows on to the SBR Lagoon via an interconnecting gravity pipe.
- Wastewater from the Lift Pump Station is also pumped directly to the SBR during the fill phase (see Section 3.5).
- The SBR discharges via a decant structure and associated pump to the existing Irrigation Lagoon.
- From the Irrigation Lagoon, wastewater is pumped to land via the irrigation system.

BLUE SKY PASTURES – WASTEWATER TREATMENT PLANT OPERATION AND MAINTENANCE MANUAL

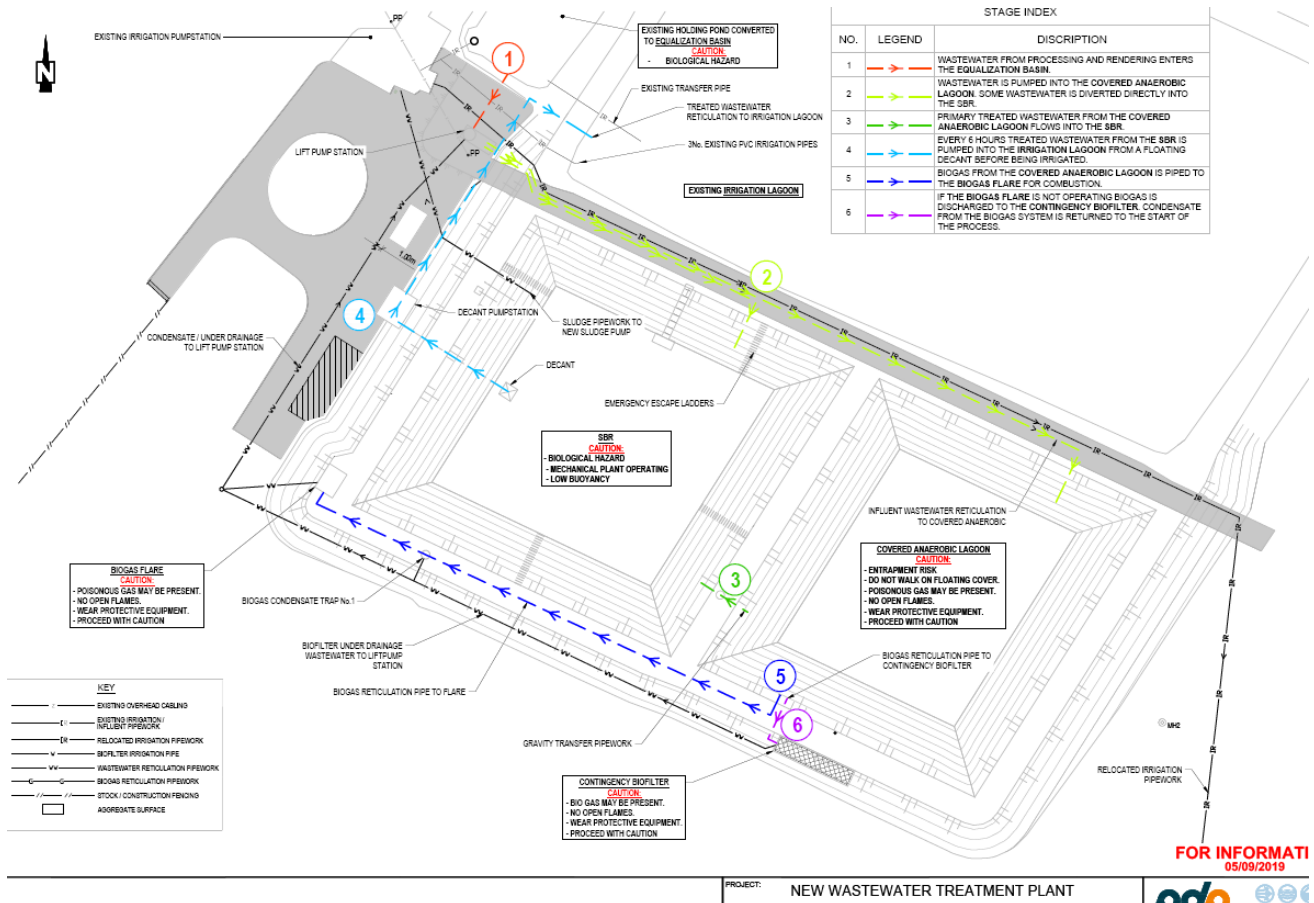


Figure 1 - WWTP General Layout

BLUE SKY PASTURES – WASTEWATER TREATMENT PLANT OPERATION AND MAINTENANCE MANUAL

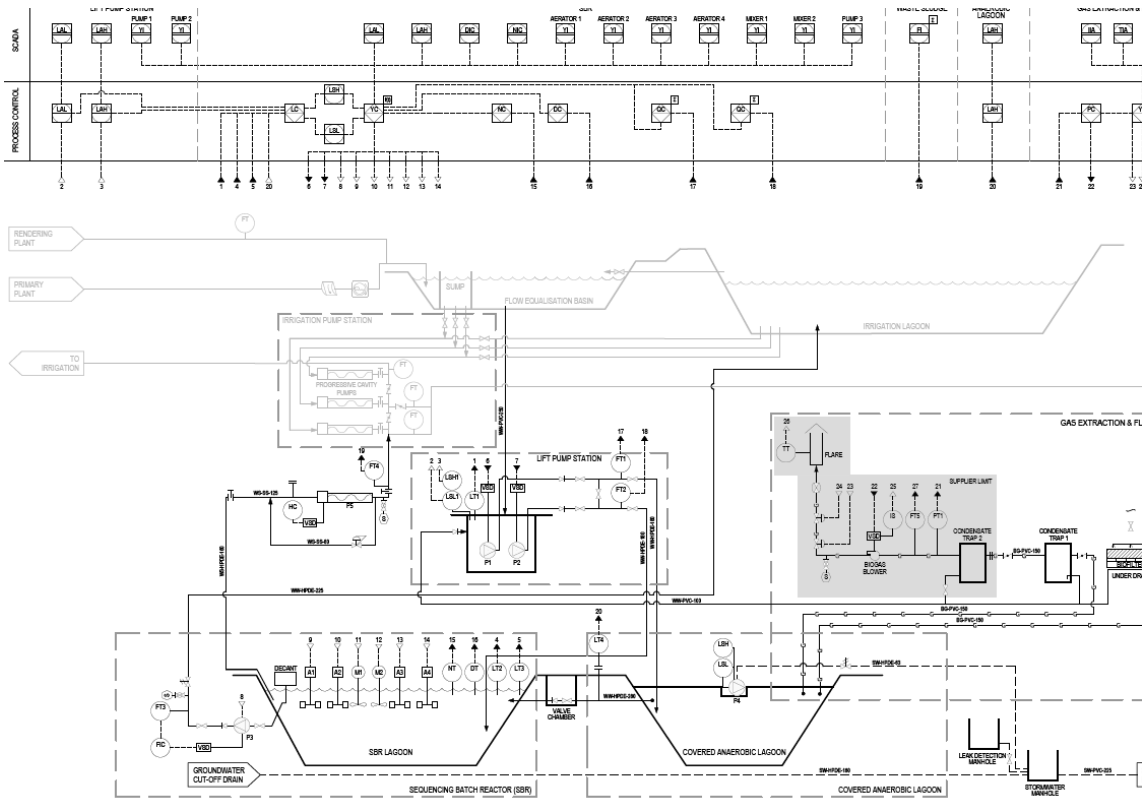


Figure 2 - WWTP P&ID

3.2 Wastewater Sources

Wastewater is generated from the meat processing plant, including slaughter floor, boning room and stockyards amongst other areas. Additional high strength wastewater is also generated from the rendering plant, located adjacent to the main slaughterhouse.

3.3 Flow Equalisation Basin

The existing clay-lined Flow Equalisation Basin has an approximate capacity of 1,000 m³. The Flow Equalisation Basin balances peak inflows upstream of the WWTP. All raw wastewater from the site passes through this basin which is connected hydraulically to the Lift Pump Station via an interconnecting polyvinyl chloride (PVC) pipe.

3.4 Anaerobic Lagoon

The Anaerobic Lagoon has a capacity of 5,000 m³, providing a hydraulic retention time (HRT) of approximately 5 days at peak production. The Anaerobic Lagoon is lined with a high-density polyethylene (HDPE) liner and has an HDPE cover for biogas collection.

The inlet to the Anaerobic Lagoon is via a single inlet pipe at the northern end of the central embankment. The inlet pipe passes through a manhole adjacent to where it enters which contains a blank flanged tee to provide a flushing/rodding point in the event of a pipe blockage.

The Anaerobic Lagoon wastewater is treated by settling out solids and breaking down organic matter via anaerobic autotrophic bacteria. The main by-product of anaerobic decomposition is biogas, mainly CH₄ and CO₂, which is collected by a gas collection pipework under the cover.

Solids settle out in the Anaerobic Lagoon and are slowly digested into a liquid stream but leaving some residual solids. The cover has two access hatches that can be utilised to enable infrequent sludge removal and seeding of the lagoon if required.

Discharge from the Anaerobic Lagoon is via a single gravity polyethylene (PE) pipe which connects it to the SBR. A rising PE pipe is connected to the transfer pipe which contains a pressure level transmitter to measure the level in the Anaerobic Lagoon. The transfer pipe also passes through a manhole which contains a manual isolation valve and a non-return valve.

3.5 Sequencing Batch Reactor

The SBR is an aerated lagoon which utilises aerobic heterotrophic bacteria (activated sludge) to reduce contaminants in the wastewater, particularly BOD and nitrogen together with some phosphorus reduction. The SBR is an HDPE

lined lagoon, with a capacity of 6,000 m³ and contains three 75 kW floating mechanical aerators and two 11 kW floating downdraft mixers.

The SBR operates in batch treatment cycles and consist of the following phases:

1. Fill: filling the reactor whilst mixing (option to aerate during filling).
2. Aerate: aeration and mixing.
3. Settle: bacterial solids allowed to settle.
4. Decant: the water layer on the surface of the lagoon is decanted for discharge.

The SBR operates 24 hours per day based on four 6-hour cycles. The end of one phase of the cycle and the start of the next is dictated by the time steps allocated to each cycle; once one cycle ends, the next then begins.

3.6 Irrigation Storage Lagoon

The Irrigation Storage Lagoon is HDPE lined with an approximate capacity of 15,000 m³ to provide storage of treated wastewater prior to disposal to land via the Irrigation Pump Station and the associated irrigation system.

3.7 Discharge

During the decant phase of SBR treatment, treated wastewater is pumped from the SBR to the Irrigation Storage Lagoon via a dry mount pump at the Decant Pump Station (Decant Pump). The pump starts at the start of the decant phase and stops based on level control ('Low Level Alarm') or when the time period for the decant phase ends. The pump discharges into the Irrigation Storage Lagoon. Stored treated wastewater is then pumped to the irrigation system via the progressive cavity pumps at the Irrigation Pump Station.

3.8 Biogas Management

Biogas produced in the Anaerobic Lagoon collects under the HDPE cover where it is extracted via slotted collection pipework (via pressurisation under the cover or assisted by the biogas blower located on the biogas flare). When the biogas flare is in operation, the collected biogas passes through a primary condensate trap and then finally a further secondary condensate trap on the biogas flare skid, upstream of the biogas blower. This biogas is then burnt off in the self-igniting biogas flare. The biogas flare converts the CH₄ content of the biogas to CO₂, and oxidises odorous gases, such as H₂S, to form non-odorous compounds.

If the biogas flare is not operational, biogas is to bypass the biogas flare and be treated through the contingency biofilter. The micro-organism community in the biofilter remove odorous components from the biogas via biological oxidation of hydrogen sulphide. The biofilter media consists of a fine bark and lime mix. The lime helps maintain the pH of the media to allow efficient removal of pollutants.

Note, the biofilter does not effectively oxidise CH₄ and as such, the biogas flare should always be the primary method of biogas management.

If the biogas blower fails, and the biogas is unable to pass to the biofilter, then biogas will collect under the cover, creating a positive pressure and expanding the cover. This should be considered an emergency event. Vent points on the cover are designed to release the gas once the cover has expanded, however in this instance, a significant risk and hazard still exists and should be treated as such.

3.9 Rainwater Management

Rainwater that collects on the Anaerobic Lagoon cover is conveyed to a sump in the centre of the HDPE cover by channels filled with weighted PE pipes. There is a submersible pump in the cover sump which is operated from a field switch at the north western corner of the Anaerobic Lagoon. The pump also has a float switch cut-off. Stormwater is pumped via a 63 mm diameter riser to the northern end of the Anaerobic Lagoon. Stormwater is discharged as follows:

- If potential stormwater contamination is observed, such as from extensive bird faeces or windblown debris, stormwater is to be discharged to the Irrigation Storage Lagoon for irrigation to land.
- If no potential contamination sources are present on the cover (i.e. the cover is clean) stormwater may be discharged to Manhole (MH) 1 which flows by gravity to the site drain to the east of the WWTP.

The discharge of stormwater to MH1 is to be approved by the WWTP Engineer.

WWTP Operators must monitor the level of water in the sump and the weighted drainage paths to determine if discharge of stormwater is required and as such, should observe the water on the cover often, especially during and after rainfall events. A reasonable volume of water is to be maintained in the sump at all times to provide weight to maintain the geometry of the stormwater channels and sump. To achieve this, the pump should be stopped manually rather than relying on the float switch which is provided as a contingency measure only.

3.10 Groundwater Management

A groundwater interception drain surrounds the lagoons and leads to MH1 (Refer to Drawing 007 of the Construction Drawings) which flows to the site drain via gravity. It is normal for this groundwater interception drain to discharge water, especially during the winter months.

The Anaerobic Lagoon and the SBR also contain under-liner leak detection systems which are installed in the sand layer directly beneath the liner. These systems discharge by gravity to MH2 (Refer to Drawing 007 of the Construction Drawings).

Sampling of MH2 is to be conducted to test for wastewater contamination (indicative of potential liner failure):

- Sampling conducted quarterly.
- Samples should be analysed for *E. coli* (cfu/100 mL).
- If analysis shows *E. coli* levels $> 10^4$ cfu/100 mL, may indicate wastewater contamination, and professional advice should be sought.
- If analysis shows low *E. coli* levels, then the valve downstream of MH2 may be opened and the accumulated volume of water in MH2 discharged before the valve is closed again.

The shared outlet for the inputs into the manholes (cover stormwater, groundwater, leak detection) includes a small concrete headwall with rock spill stabilised face.

3.11 Solids Management

3.11.1 Managing Solids in the Anaerobic Lagoon

The Anaerobic Lagoon removes most of the TSS from the wastewater. These solids will slowly accumulate inside the lagoon as a result of settled non-degradable solids and anaerobic bacterial cells. The accumulation of solids in the Anaerobic Lagoon is an essential part of the treatment process as the solids in the wastewater settle and break down through anaerobic digestion. With time the volume of solids will increase to a level where it starts to have an impact on the HRT in the system and the efficiency of the treatment system.

The solids management procedure for the Anaerobic Lagoon is as follows:

- Measure the solids content by probing for solids through the access hatches.
- If solids make up over 70% of the lagoon volume, desludging is required.
- If desludging is required, the removal shall occur during maintenance shutdown or during the low processing period.

The solids removal procedure for the Anaerobic Lagoon is as follows:

- A contractor shall be commissioned to pump the solids from the access hatches.
- Solids can be removed from the base of the lagoon using a submersible open impellor pump/mixer or vacuum pump.
- To aid in dewatering, the removed solids can be mixed with a polyelectrolyte (polymer). A polymer supplier or a Wastewater Expert can assist with polymer and dose rate selection.

- After dewatering, return the supernatant to the Anaerobic Lagoon.
- The solids can be disposed to landfill, onto farmland, or composted (subject to appropriate consents being in place).

3.11.2 Managing Solids in the SBR

Sludge settling tests shall be carried out at least weekly to determine the concentration of solids in the SBR. During commissioning or processing start-up after an extended break, sludge settling tests and TSS sampling is to be carried out more frequently (daily) to assist in determining the frequency of wasting.

The sludge settling test is as follows:

1. Take a one litre sample in a measuring cylinder/settleometer.
2. Leave for 30 minutes.
3. Observe settling.

If the mixed liquor settles but the level is greater than 60% of the sample depth the WAS pump (Pump 5) should be manually switched ON during the fill and mix and aeration phases. The duration of sludge wasting each day is to maintain consistent levels of sludge in the SBR, equivalent to 60% mixed liquor as measured by the sludge settling tests. Sludge wasting duration will be confirmed by the WWTP Engineer based on experience and guidance from the Wastewater Technical Experts.

If settling is poor (solids remain in suspension) in the sludge settling tests, despite wasting, this could indicate overloading of the system.

3.12 Treatment System Instrumentation Controls

3.12.1 Automated Control System

The WWTP is operated predominantly on an automatic control. The system is controlled via an HMI screen in the WWTP Motor Control Centre (MCC) building. System setpoints can be amended by accessing the HMI 'Setpoints' function and processing data can be observed in the 'Trends' function when a particular process/plant item is selected (e.g. Aerator 1). The 'Reports' function shows daily, weekly and monthly totalised flow and run hours data. Figure 3, 4 and 5 show the main HMI screen, 'Setpoint' screen and the 'Reports' screen respectively.

The EIS WWTP HMI Manual is included as Appendix B which describes the HMI symbology in more detail. It is important that Operators have a fundamental understanding of the WWTP Functional Description which is also appended to this O&M Manual.

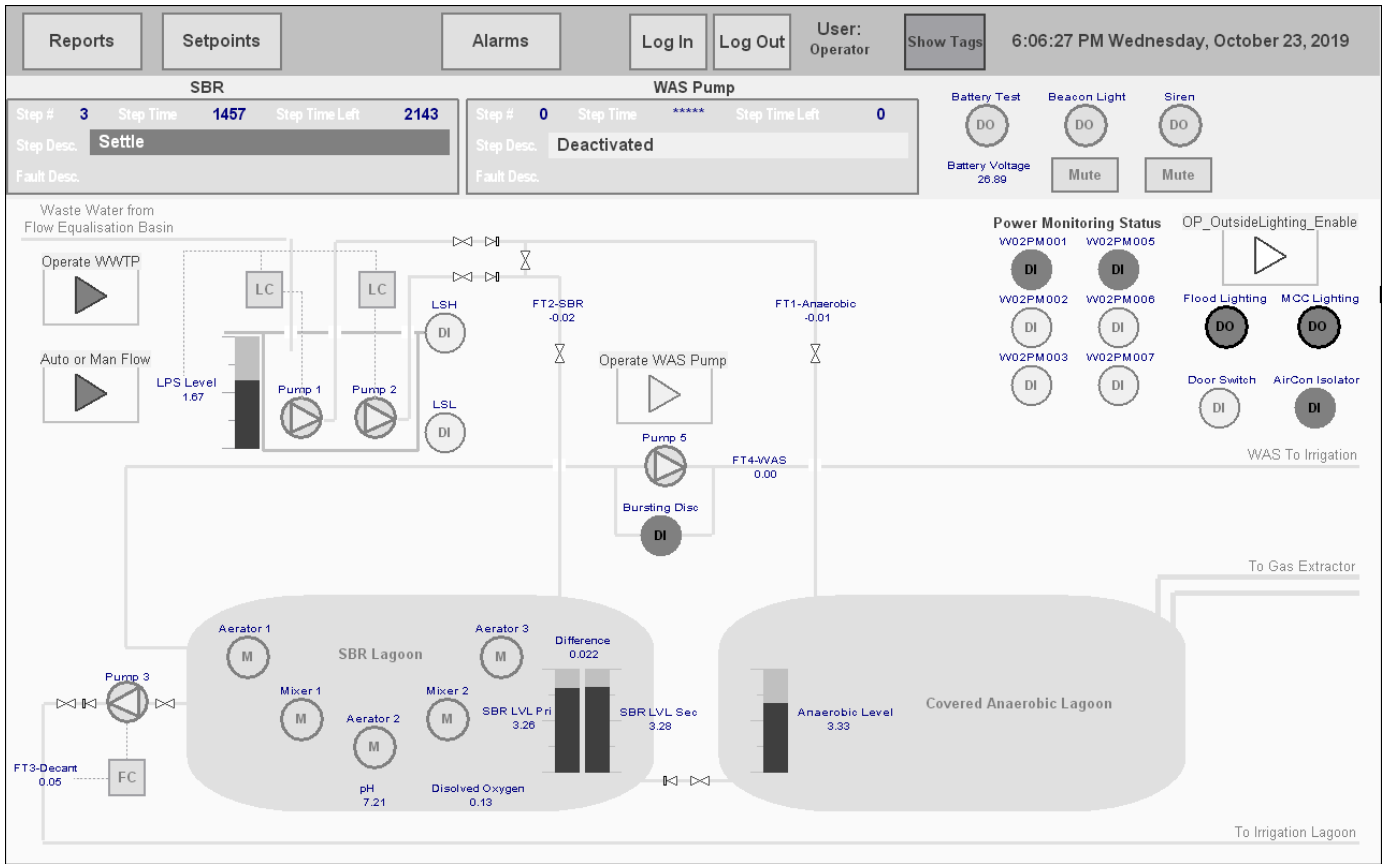


Figure 3 - Main HMI Display

Reports
Setpoints
Alarms
Log In
Log Out

User: Operator
Show Tags
6:06:51 PM Wednesday, October 23, 2019

Setpoints

Anaerobic Lagoon Bypass SP	30.00 %	SBR Target Level SP after LSH (LT2)	3.40 m
Cycle Volume Manual Setpoint (in place of calculated cycle volume)	250.00 m ³	SBR Level Switch Low Low SP (LT2)	3.20 m
Aerator stage Start/Stop time interval	10.00 mins	SBR Level Switch High High SP (LT2)	3.60 m
Disolved Oxygen Setpoint 1 for Aeration Control	4.00 mg/l	Acceptable difference between LT2 and LT3	0.15 m
Disolved Oxygen Setpoint 2 for Aeration Control	3.00 mg/l	SBR Level Switch Low SP (LT3-Backup)	3.33 m
Disolved Oxygen Setpoint 3 for Aeration Control	2.00 mg/l	SBR Target Level SP after LSL (LT3-Backup)	3.40 m
Disolved Oxygen Setpoint 4 for Aeration Control	1.00 mg/l	SBR Level Switch High SP (LT3-Backup)	3.50 m
SBR Decant Target Flow	70.00 l/s	SBR Target Level SP after LSH (LT3-Backup)	3.40 m
Lift Pump Station Target Level	1.30 m	SBR Level Switch Low Low SP (LT3-Backup)	3.20 m
Setpoint to Stop Pump 1 run after LSH	1.50 m	SBR Level Switch High High SP (LT3-Backup)	3.60 m
Lift Pump Station Low Level Alarm Setpoint	0.95 m	WAS Pump Speed	100.00 %
Lift Pump Station High Level Alarm Setpoint	1.70 m	SBR Low pH Alarm	6.50 pH
Anaerobic Lagoon High Level Alarm Setpoint	3.50 m	Pump 1 Cyclic volume to Anaerobic Lagoon (Calculated)	175.00 m ³
SBR Level Switch Low SP (LT2)	3.33 m	Pump 1 Lift Station High Level Speed	100.00 %
SBR Target Level SP after LSL (LT2)	3.40 m	Pump 2 Cyclic volume to SBR (Calculated)	75.00 m ³
SBR Level Switch High SP (LT2)	3.50 m		

CLOSE

Figure 4 - HMI Setpoints Screen

Reports		Setpoints		Alarms		Log In		Log Out		User: Operator		Show Tags		6:06:44 PM Wednesday, October 23, 2019		
		Totals (m ³)			Average Rate (l/s)			Min (l/s)		Max (l/s)						
		Daily	Weekly	Monthly	Daily	Weekly	Monthly	Daily	Daily							
<u>Present</u>																
Anerobic Lagoon Influent Flow Meter		334.72	1702.86	3987.69	8.37	8.00	2.03	-0.02	28.85							
SBR Influent Flow Meter		75.16	226.19	523.44	1.88	1.06	0.27	-0.08	24.51							
SBR Decant Flow Meter		373.33	1596.75	4289.17	9.33	7.50	2.18	-0.05	70.95							
WAS Pump Flow Meter		0.29	0.95	6.29	0.01	0.00	0.00	-0.00	1.28							
<u>Previous</u>																
Anerobic Lagoon Influent Flow Meter		774.90	1874.80	145.54	8.97	3.10	0.05	-0.02	28.92							
SBR Influent Flow Meter		75.15	296.46	16.66	0.87	0.49	0.01	-0.07	23.35							
SBR Decant Flow Meter		756.26	2882.75	645.31	8.75	4.44	0.24	-0.05	90.09							
WAS Pump Flow Meter		0.02	2.99	9.89	0.00	0.00	0.00	-0.00	0.36							
<u>Run Hours</u>		Current Month			Last Month			Total								
Aerator 1 - SBR Lagoon		30.58	10.90	41.48												
Aerator 2 - SBR Lagoon		30.52	10.52	41.03												
Aerator 3 - SBR Lagoon		22.27	11.27	33.53												
Mixer 1 - SBR Lagoon		113.77	175.26	289.05												
Mixer 2 - SBR Lagoon		28.58	56.33	84.92												
Lift Pump 1 - to Anerobic Lagoon		61.95	5.93	67.88												
Lift Pump 2 - to SBR Reactor		9.90	2.27	12.17												
SBR Decant Pump - to Irrigation Lagoon		19.30	7.47	26.77												
WAS Pump - to Irrigation		0.00	0.65	0.65												
SBR Dissolved Oxygen Transmitter		1.63	1.80	11.21	0.09	5.37										
SBR pH Transmitter		7.26	7.21	8.15	7.11	7.43										
CLOSE																

Figure 5 - HMI Reports Screen

3.12.2 Anaerobic Lagoon

The Anaerobic Lagoon is filled from the Lift Pump Station, with the fill operation calculated by the Programmable Logic Controller (PLC).

The discharge from the Anaerobic Lagoon to the SBR is controlled by the level in the SBR lagoon. There is a level transmitter in the transfer pipe which will stop any further wastewater from being pumped into the Anaerobic Lagoon if the Anaerobic Lagoon High Level Alarm Setpoint is reached.

3.12.3 SBR Control

The SBR is controlled by the PLC. The PLC controls the four SBR cycles and mixer and aerator operation, based on a timer sequence with override control based on SBR water level and DO concentration.

The PLC timer is the controller setting the phase of operation at any given time. The SBR is operated on four 6-hour cycles, with each cycle split up into phases as detailed in Table 2.

Table 2: SBR Phasing	
Phase	Plant Operation
Fill/Anoxic – 1 Hour (Starting at 0700 every day)	<ul style="list-style-type: none"> • P2 ON as required to supply carbon to the SBR Anaerobic Lagoon (Anaerobic Lagoon Bypass). • P1 to maintain level in Flow Equalisation Basin. • Mixers ON, OR Aerators and Mixers ON to maintain a shorter anoxic phase.
Aerate – 3 Hours	<ul style="list-style-type: none"> • One mixer and aerator(s) ON as required to maintain the DO setpoints. • P1 to transfer daily volume and maintain level in Flow Equalisation Basin. • P2 OFF.
Settle – 1 Hour	<ul style="list-style-type: none"> • Aerators and mixers OFF. • P1 to transfer daily volume and maintain level in the Flow Equalisation Basin.
Decant – 1 Hour	<ul style="list-style-type: none"> • Aerators and mixers OFF. • P1 to transfer daily volume and maintain level in Flow Equalisation Basin. • P3 ON.

DO or pH will control aerator operation during the aerate phase, turning the aerators ON and OFF as required by the wastewater load. The operator can select on the HMI if pH or DO is to be used to control aerator operation, with adjustable setpoints available for each.

In the decant phase, P3 will run until the phase is complete, or until ‘SBR Level Switch Low’ is reached as determined by two level transmitters (one pressure and one radar). The operator can select which transmitter is set to primary duty, and as such, the non-selected transmitter will become the backup.

3.12.4 Biogas Flare

The supplier-provided biogas flare Functional Description and O&M Manual is included within the WWTP Function Description (Appendix A).

The biogas collection system operates on pressure control as well as timer control. When the pressure under the lagoon cover rises, due to biogas production, the biogas blower starts and operates the biogas flare. When the pressure under the cover reaches a set vacuum pressure (‘low pressure cut-out’), the biogas blower and biogas flare stop and will not start again until the pressure rises to the restart pressure and the pre-set time delay has elapsed. If the pressure under the cover gets too high an alarm is triggered. If the biogas flare

fails to ignite, biogas is to be re-directed to the biofilter. The manual valve on the biogas pipework allows the biogas to be directed to only the biofilter so that maintenance or repair work can be undertaken on the biogas flare.

Operational setpoints for the biogas flare are to be modified only with approval from the WWTP Engineer.

3.12.5 Flow Management

In its current state, the wastewater treatment system is designed to manage wastewater flows up to 1,000 m³/d, but the PLC is programmed such that flows less than 1000 m³/d or up to 1,200 m³/d can also be handled. Table 3 shows the key level and flow control setpoints.

The Flow Equalisation Basin balances flow variations from the processing plant. The two submersible pumps (P1 and P2) in the Lift Pump Station pumps the balanced wastewater to the Anaerobic Lagoon and SBR respectively at a rate of up to 23 L/s (each). These pumps are Variable Speed Drive (VSD) operated. Their operation is based on the reading from a radar level transmitter in the Lift Pump Station. When the water level in the Lift Pump Station is between two setpoint values, the PLC will alter the VSD rate to maintain the level in the Lift Pump Station i.e. P1 (and during the fill phase, P2) will try and maintain the same flow as what is coming in from the WWTP.

While the level setpoints will override operation of the lift pumps (to make sure the Flow Equalisation Basin does not overflow or run dry), the WWTP Operator can select how the flow of wastewater into the WWTP is managed from the HMI:

1. Manual - the WWTP Operator can manually enter a target flow using the 'Setpoints' function on the HMI.
2. Auto - the PLC will match the previous day's influent volume.

When the WWTP is fully operational, the flow is expected to perpetually run in Auto. Some days of the processing season may require a manual run (e.g. season start, season end, addition of another shift).

3.12.5.1 Anaerobic Lagoon Bypass

While most wastewater will be routed from the Flow Equalisation Basin into the Anaerobic Lagoon, some raw wastewater needs to be pumped into the SBR to provide a carbon source. The percentage to be pumped directly to the SBR is a set value specified using the HMI 'Setpoints' function ('Anaerobic Lagoon Bypass SP'). This is transferred via P2 during the fill phase. The default percentage to be used is 30%.

3.12.5.2 Flow Transfer into the SBR

Flow between the Anaerobic Lagoon and the SBR is via gravity. The transfer flowrate will therefore respond to higher inputs from the Lift Pump Station, increasing the water level in the Anaerobic Lagoon.

Table 3: Level and Flow Control Setpoints	
Control Parameter	Setpoint
Anaerobic Lagoon High Level Alarm Setpoint	3.70 m
Anaerobic Lagoon Bypass Setpoint	30 % (or as specified by the Wastewater Technical Expert)
SBR Level Switch Low SP	3.33 m
SBR Level Switch High SP	3.50 m
SBR Level Switch High High SP	3.60 m
SBR Decant Target Flow	70 L/s

4.0 WWTP Operation

4.1 Overview

This section outlines the general requirements that are necessary to maintain efficient wastewater treatment and recommended methods for solving treatment performance problems if they occur. Treatment performance problems are to consider the WWTP treatment system holistically, as problems can often be resolved in various system components.

4.2 Management of Wastewater Contaminants

The key treatment processes for the WWTP is removal of BOD₅, TSS and nitrogen.

4.2.1 Managing BOD₅

The Anaerobic Lagoon is designed to remove 80% to 90% of the incoming BOD₅ in the raw processing wastewater. The effluent wastewater from the SBR is intended to have a BOD₅ concentration of less than 50 g/m³. The following conditions are required to consistently achieve the target effluent BOD₅ concentration:

- The incoming wastewater quality is reasonably consistent.
- No accumulation of solids in the Anaerobic Lagoon to a level that exceeds 70% of the pond volume.
- The temperature of the Anaerobic Lagoon is maintained below 35°C and the pH is above 6.0.
- The aeration capacity of the SBR is maintained.
- The MLSS in the SBR are maintained above 2,000 g/m³ and less than 6,000 m³.
- The pH in the SBR is above 5.5.
- No undesirable chemicals have been discharged to the wastewater treatment system.

If the BOD₅ in the final discharge is consistently higher than 50 g/m³ then the system performance needs to be investigated.

Analyse the Anaerobic Lagoon effluent and check if 80% removal occurs (sampling of the influent and discharge). If not, then check the following:

- The quality of the incoming wastewater (to check for unexpected discharges e.g. chemicals, spills, unusual rendering load).
- The Anaerobic Lagoon effluent temperature (to see that it does not exceed 35°C).

- The Anaerobic Lagoon pH (to check that pH is above 6.0).

If the Anaerobic Lagoon is achieving 80% BOD₅ removal then the SBR Lagoon operation will require assessing, including:

- Recalibrating the DO probe.
- Checking that the required DO setpoint is being maintained.
- Checking that the aerators are all operational.
- Checking that the MLSS in the SBR are maintained above 2,000 g/m³ and less than 6,000 m³.
- If the above investigations are unable to identify an apparent issue, or an issue is identified that cannot be easily amended, consult a Wastewater Technical Expert.

4.2.2 Treated Effluent Suspended Solids

Under normal operation, the TSS concentration in the treated effluent needs to be consistently below 150 g/m³. If in exceedance of this level, then solids will carry over from the SBR to the Irrigation Storage Lagoon. The TSS concentration is reduced by wasting solids via P5. Check by performing the mixed liquor settling test, described below:

1. Take a one litre sample in a measuring cylinder/settleometer.
2. Leave for 30 minutes.
3. Observe settling.

If the mixed liquor settles but the level is greater than half of the sample depth, waste solids as instructed by the Wastewater Technical Expert or the wasting plan. However, if settling is poor (solids remain in suspension), this could indicate overloading of the system. Consult with a Wastewater Technical Expert.

4.2.3 Nitrogen Management

Proteins in the raw effluent from the meat processing plant are broken down in the Anaerobic Lagoon, releasing NH₄⁺ into the wastewater. Bacteria in the SBR oxidise the NH₄⁺ to NO₃⁻, whilst other bacteria convert NO₃⁻ to N₂, which is released from the wastewater to the atmosphere. This two-stage process is sensitive to the operational parameters of the SBR, including DO levels, pH, BOD concentration, and bacterial solids concentration (MLSS). It is important that the following SBR operational setpoints are maintained for optimal treatment:

- DO level > 0.5 g/m³
- 6.5 < pH < 7.5
- 2,000 g/m³ < MLSS concentration < 6,000 g/m³

The wastewater treatment system has been designed such that the treated wastewater consistently achieves:

- $\text{NH}_3\text{-N}$ concentration $< 50 \text{ g/m}^3$
- $\text{NO}_3\text{-N}$ concentration $< 100 \text{ g/m}^3$ (preferred $< 50 \text{ g/m}^3$)

If the nitrogen levels in the treated effluent are found to consistently exceed these levels, then the above operating parameters need to be investigated.

1. If the $\text{NH}_3\text{-N}$ concentration is consistently above 50 g/m^3 , this could be due to:
 - Low DO setpoint (i.e. insufficient aeration).
 - Low pH.
 - Low MLSS concentrations.

If the $\text{NH}_3\text{-N}$ load entering the SBR from the Anaerobic Lagoon is consistently above the design level then this may be causing a high $\text{NH}_3\text{-N}$ concentration in the treated effluent. If this occurs:

- Investigate the $\text{NH}_3\text{-N}$ load from the Anaerobic Lagoon.
- Provision to install a further 75 kW aerator.

2. If the $\text{NO}_3\text{-N}$ concentration is consistently above 100 g/m^3 , this could be due to:
 - High DO setpoint.
 - Aerators turned ON together with the mixers during the initial 1-hour 'Fill/Anoxic' phase.
 - Insufficient supply of BOD from the Anaerobic Lagoon.
 - The flow split of raw wastewater to the SBR may be too small.

The investigation procedure for high $\text{NO}_3\text{-N}$ concentration is:

- Investigate each parameter outlined above.
- The total combined BOD load entering the SBR from the Anaerobic Lagoon needs to be at least four times the $\text{NH}_3\text{-N}$ load entering SBR Lagoon. To increase the BOD load being supplied from the Anaerobic Lagoon, the flow from P2 (Anaerobic Lagoon Bypass SP) will need to be increased.
- The DO level needs to be maintained at or below 1.0 g/m^3 .

If the cause of the high nitrogen levels is unable to be identified and remedied, consult with a Wastewater Technical Expert.

4.3 Odour Management

If an odour is identified at the site, then this must be investigated immediately and where possible minimised and eliminated. Possible sources of odour include:

- Biogas emissions from the Anaerobic Lagoon cover or treatment systems.
- Odour emissions from the SBR lagoon.

If it is identified that the odour is passing beyond the site boundary and a complaint has been received, refer to Section 8 of the Manual.

4.3.1 Biogas Odours

If it is identified that odours are being emitted from the biogas collection and/or treatment system, then identify the exact source and arrange for immediate repair.

If the odour is being generated from the biofilter, it is noted that while the biofilter will remove a majority of H₂S from the biogas, it is unlikely to completely remove it and potential odours may still be detectable in close proximity to the biofilter when it is operating. There is no need to raise alarm if only a slight detection of H₂S occurs, only do so if the odour is detectable beyond the property boundary.

To maximise the biofilter efficiency, the biofilter must be kept moist and maintained at a pH level between 5 to 8. Thinly spread 10 kg of hydrated lime on the biofilter surface to maintain pH as required.

4.3.2 SBR Odours

Odour generation from the SBR can be an indication that the SBR is being overloaded. In this case a loading assessment of the SBR Lagoon needs to be conducted, along with an investigation into the treatment performance of the Anaerobic Lagoon. In this case, it is recommended that the following actions be taken:

1. Stop all flows through P2 by setting the Anaerobic Lagoon Bypass setpoint to zero on the HMI, in preference of all flows passing through the Anaerobic Lagoon (P1).
2. Turn the aerators ON together with the mixers during the Fill/Anoxic phase (effectively changing this phase from an anoxic phase to an aerobic phase).
3. Assess the DO setpoint, and if possible, increase it to 2.5 g/m³.

4. If the aerators are unable to provide ongoing maintenance of DO levels beyond 0.1 mg/L, then sample the Anaerobic Lagoon effluent from the transfer pipe between the two lagoons.
 - a. If the BOD concentration is above 1,000 mg/L, investigate raw wastewater loads to identify any over-loading issues or performance problems with the Anaerobic Lagoon.
5. If the odour from the SBR Lagoon continues, consult with a Wastewater Technical Expert.

4.4 Summary of Operational Limits

Table 4 summarises the recommended operation limits for the WWTP. If the WWTP is operating outside any one of these limits and remedial action is not obvious from this O&M Manual, seek advice from a Wastewater Technical Expert.

Table 4: Process Operational Criteria		
Parameter	Lower limit	Higher limit
Anaerobic Lagoon Sludge Levels	10%	70%
SBR MLSS	2,000 mg/L	6,000 mg/L
<i>Final Effluent</i>		
Peak Daily Flow	-	1,200 m ³ /d
Instantaneous Flow	-	90 L/s (from Decant Pump Station)
BOD ₅	-	50 mg/L
pH	6.0	8.0
NH ₄ -N	-	50 mg/L
NO ₃ -N	-	100 mg/L
TSS	-	150 mg/L
<i>Biofilter</i>		
Bed Media pH	5.0	8.0
Bed Media Pressure Drop	20 mm	100 mm

5.0 Plant Maintenance

5.1 Supplier Documentation and General

This section provides details of maintenance procedures for individual components of the WWTP. Regular routine maintenance is essential for reliable operation. Note that H&S considerations are not explicitly stated in the maintenance requirements. The operator shall refer to the H&S section of this O&M manual and the site-specific H&S requirements.

The available supplier documentation is listed in Table 5.

Table 5: Supplier Documentation List

SUPPLIER	DOCUMENT NAME(S)	HARDCOPY (H) ELECTRONIC (E)	LOCATION
Miscellaneous¹			
Xylem	Flygt Pumps Maintenance Schedule and Checklist	E	
Unknown	ABB Watermaster Flowmeter Package	E	
Flow Equalisation Basin			
Unknown	Contrashear Milliscreen Data Sheet	E	
Lift Pump Station			
Xylem	Flygt 3127 Pump Data Sheet	E	
SBR Lagoon			
Unknown	Jumo Maera F27 Level Transmitter	E	
Unknown	Siemens EchoMax XPS Level Transducer	E	
Unknown	Siemens LUT400 Ultrasonic Controller	E	
Hach	SC200 Controller, LDO Sensor, pH SC Sensor Package	E	
Aeris Global	Aquaturbo Aerator, Mixer, Decant Package	E, H	MCC Building
Anaerobic Lagoon			
Unknown	Nivopress NK 41-03 Level Transmitter	E	
Lowara	Lowara Submersible Stormwater Pump	E	
Decant Pump Station			
Xylem	Flygt 3153 Pump Data Sheet	E	
Deeco	Vent-O-Mat RGX Data Sheet	E	
Deeco	RGX Owner's Manual	E	
Irrigation Pump Station			
Wallace Murray Electrical	Mono E Range Pumps Maintenance Manual	E	
Custom Controls	Fike Rupture Disc	E	
Biogas Flare			
Windsor Engineering	Biogas Flare Instrumentation and Valve Supplier Package	E	
Windsor Engineering	Biogas Flare Written Documentation ²	E, H	
Notes: 1. Miscellaneous items which may be relevant to more than one process area such as flowmeters 2. Includes drawings, logic tables, O&M manual, functional description etc.			

5.2 Pipework and Valves

Operation procedure for the pipework and valves:

- Conduct regular checks to ensure the inlet and outlet pipes are clean. This may involve observing how flow is exiting pipes.
- Inspect all exposed pipes, fittings and valves.
- Open/close checks on all valves at three monthly intervals.
- Flush/cleanout the main delivery pipes to the Anaerobic and SBR Lagoons annually.

5.3 Pumps

Maintain pumps as follows:

- Check operation daily.
- Mechanically inspect the pumps every six months.
- Conduct regular checks of lifting handles and chains of sumps only.
- Conduct intermediate and major overhauls every 2-3 years or 5,000-8,000 run hours as dictated by the maintenance manual for the specific pump. Note that different pump models from the same manufacturer may require different servicing intervals.
- Update the Maintenance Log after any maintenance.

5.4 Instrumentation

Instrumentation maintenance procedure:

- Conduct validation of flowmeter outputs annually.
- Calibrate level transmitters and sensors as per the specific manufacturer's instructions OR when these have encountered wastewater (radar transmitters only).

5.5 Lift Pump Station Maintenance

In addition to the maintenance of the pumps and instruments inside the GRP chamber, the Lift Pump Station shall be maintained as follows:

- Inspect and clean the Lift Pump Station GRP chamber monthly, including pressure cleaning all surfaces. Care should be taken to not damage any instrumentation during this process.

5.6 Flow Equalisation Basin

- Check the wastewater level daily and note the surface condition (e.g. thick crust, foam etc.).

- Annually drain, excavate the sludge and re-trim/shape the Flow Equalisation Basin and dispose of the contents appropriately.

5.7 Anaerobic Lagoon Maintenance

The Anaerobic Lagoon is a sensitive treatment process and is crucial to the successful operation of the WWTP.

- The Anaerobic Lagoon freeboard shall be maintained at a minimum of 400 mm and a maximum depth of 3.6 m.
- Inspect the cover stormwater sump and activate pump to drain rainwater from the cover daily. Always leave a portion of rainwater remaining on the cover such that the channels remain flooded.
- De-sludge the Anaerobic Lagoon during shutdown when the sludge level reaches approximately 70% of the lagoon volume, or when the treatment performance is affected.

5.8 SBR Lagoon

The SBR Lagoon contains several mechanical components that require regular maintenance.

- The SBR lagoon freeboard shall be maintained at a minimum of 500 mm and a maximum pond level of 3.5 m.
- Check the aerators and mixers are functioning properly (should be able to see water surface move in a circular pattern during the fill phase).
- Clean the DO and pH probes in the SBR on a weekly basis.
- Calibrate the DO and pH probes in accordance with manufacturer's documentation.
- Conduct sludge settling tests daily to determine wasting. This process is covered in Section 4.2.2.
- Check that the aerator and mixer mooring cables are attached securely weekly or whenever the cable systems have been adjusted or used.
- Maintain the aerators and mixers as per manufacturer's instructions.

5.9 Biogas Treatment

The gas treatment system shall be maintained in accordance with the biogas flare manufacturer requirements and as detailed below:

- Drain condensate from Condensate Trap 2 weekly by opening the drain valve.

- Conduct regular maintenance on the biogas blower unit as per the manufacturer’s instructions.
- Conduct daily “smell test” downwind of the biogas flare by sniffing for odours. If an odour is detected, check the biogas flare system temperature.
- Replace the biofilter media when required or once every five years. The media may need to be replaced earlier, and the need for this can be characterised by increased odours when the biofilter is in use, or deterioration of integrity of the media mix.
- Pass collected gases through the biofilter for one hour at normal gas production rates once per month to assess performance.
- If the pH in the biofilter is below 5, spread hydrated lime thinly over the top of the biofilter and irrigate. Check this monthly.
- Check that the pressure drop across the biofilter is below 100 mm via the manometer mounted on the biofilter.
- If the moisture levels are too low (i.e. the media is dry), then manually irrigate the biofilter media.
- Remove weeds from the biofilter as soon as they begin to grow.

5.10 Daily O&M Checklist

A daily O&M checklist is provided in Appendix C.

5.11 Routine Maintenance Schedule Summary

A routine maintenance summary has been developed and is attached as Appendix D.

6.0 Contingency, Response and Troubleshooting

In the event of process malfunctions or equipment failure, Table 6 outlines contingency measures to remedy potential issues. This table outlines recommended resolution procedures for some potential operational problems, but other undiscussed issues may require expert input.

Table 6: Contingency and Response Procedures

Event/Risk	Contingency/Response
<p>HIGH LEVEL ALARMS</p>	
<p>‘High Level Alarms’ in any part of the WWTP (Flow Equalisation Basin, Lift Pump Station, Anaerobic Lagoon, SBR Lagoon or Irrigation Storage Lagoon) will require immediate attention by the operator to prevent loss of treatment performance, a spill to the environment or damage to equipment and hazardous working environments.</p> <p>In the event of a ‘High Level Alarm’:</p> <ul style="list-style-type: none"> • The HMI panel will light up with an alert. • An alarm will sound. • An alarm will appear on the main site SCADA. 	
<p>‘High Level Alarm’ in WWTP</p>	<p>Contingency:</p> <p>A ‘High Level Alarm’ in either the SBR or Anaerobic Lagoons will stop P1 and P2, ceasing flow into the lagoons. The ‘High Level Alarm’ condition will be alleviated once the decant phase of the SBR begins and effluent is pumped out. The Flow Equalisation Basin will provide contingency storage in such an event.</p> <p>If a ‘High Level Alarm’ is raised in the Lift Pump Station, P1 will ramp up to meet the incoming flow.</p> <p>If a ‘High Level Alarm’ is raised in the Irrigation Storage Lagoon, one or more of the irrigation pumps can be used to irrigate the wastewater to land.</p> <p>Response:</p> <p>‘High Level Alarms’ in these areas may be caused either by a pump or instrument (level) failure:</p> <ol style="list-style-type: none"> 1. If the ‘High Level Alarm’ is due to a pump failure, the response shall be as outlined in the following procedure. 2. If the ‘High Level Alarm’ is due to equipment failure, run the pumps in manual mode and clean/repair/replace the level equipment as soon as possible.

Table 6: Contingency and Response Procedures

Event/Risk	Contingency/Response
<p>PUMP FAILURE</p>	
<p>A pump failure alarm will require immediate action by the operator to prevent loss of treatment performance, a spill to the environment or damage to equipment and hazardous working environments.</p>	
<p>In the event of a pump failure:</p>	
<ul style="list-style-type: none"> • The HMI panel will light up with an alert. • An alarm will sound. • An alarm will appear on the main site SCADA. 	
<p>Pump Failure</p>	<p>Contingency:</p> <p>If either P1 or P2 in the Lift Pump Station fails, the valving arrangement can be manipulated to utilise the operational pump to discharge to either the SBR or Anaerobic Lagoons. If P3 fails, it is considered a critical event and repairs should be conducted as soon as possible. Flow into the WWTP should be shut off.</p> <p>If there is insufficient volume in the Flow Equalisation Basin to attenuate the flow, then a temporary pump can be used to direct the raw wastewater directly to the Irrigation Storage Lagoon whilst the pump is repaired or replaced. If an irrigation pump fails, the Irrigation Storage Lagoon provides 12-15 days’ storage depending on the processing flows.</p> <p>Response:</p> <p>In the event of a pump failure the operator shall:</p> <ol style="list-style-type: none"> 1. Restart the duty pump manually. 2. If this fails, manually change the valve arrangement if possible, as required. 3. If P3 fails, assess available time based on current SBR phase and level in the Flow Equalisation Basin. 4. Remove pump(s) and investigate/seek supplier advice or carry out repairs as soon as possible. 5. If not easily fixed, provide a temporary pump to pump incoming wastewater directly to the Irrigation Storage Lagoon. 6. Notify the General Manager Operations as a cease in processing may be required.

Table 6: Contingency and Response Procedures

Event/Risk	Contingency/Response
<p>BIOGAS FLARE FAILURE</p>	
<p>Failure of any part of the biogas flare (e.g. ignition or biogas blower) is an important but non-critical event and shall be addressed by the duty WWTP Operator as soon as practicably possible. In the event of a failure on the biogas flare skid:</p> <ul style="list-style-type: none"> • An alarm will be raised and shown on the HMI panel. • The alarm will be relayed to the main site SCADA. 	
<p>Biogas Flare Failure</p>	<p>Contingency:</p> <p>The biofilter provides a contingency means of managing the biogas generated from the Anaerobic Lagoon. However, due to limited H₂S removal capabilities, it should only be used in an emergency (i.e. biogas flare failure) or during maintenance of the biogas flare.</p> <p>Response:</p> <p>In the event of a biogas blower failure, the WWTP Operator shall:</p> <ol style="list-style-type: none"> 1. Attempt to restart the biogas flare system. 2. If this fails, immediately check on the operation of the biofilter to ensure biogas is passing freely through it. Check the manometer reading, media moisture and pH. 3. If required, engage assistance from the biogas flare supplier Windsor Engineering which may involve off-site repair or replacement of certain components.
<p>CHEMICAL SPILLS</p>	
<p>For daily operation, no special chemicals are required. Any spillage of chemicals that are used shall be dealt with on a case-by-case basis and according to the chemical SDS. It shall be the WWTP Operator’s responsibility to address these issues.</p>	
<p>Chemical Spills</p>	<p>Contingency:</p> <p>It is not expected that hazardous chemicals will be used as part of routine operation of the WWTP.</p> <p>Response:</p> <p>In the event of a chemical spill, the WWTP Operator shall:</p> <ol style="list-style-type: none"> 1. Review the H&S plan for the site and specific chemical SDS which should have been read and understood prior to the chemical use. 2. Add neutralising agents if required.

Table 6: Contingency and Response Procedures

Event/Risk	Contingency/Response
	<ol style="list-style-type: none"> 3. Clean the area with the appropriate agents. 4. Review the possible effect on the wastewater treatment system which is likely to involve specialist advice.
<p>FOAMING</p> <p>At system commissioning prior to establishment of bacterial populations in the SBR, foaming is expected. Once the system has stabilised, foaming is expected to subside. If significant foaming or foam with a change in characteristics (e.g. odour, thickness, colour) is observed, this may indicate overloading of the system or various other treatment issues. Additionally, foam can be blown to the nearby site drain which could trigger conductivity alarms. Any significant foaming or foaming out of the ordinary shall be dealt with immediately.</p>	
<p>Foaming in SBR</p>	<p>Contingency:</p> <p>Once established, the system will be relatively resilient to minor changes in loading and as such is expected to adjust to minor day-to-day changes in kill numbers.</p> <p>Response:</p> <p>In the event of significant foaming:</p> <ol style="list-style-type: none"> 1. On the HMI, switch the duty level transmitter to PRESSURE (LT3). 2. Determine if there will be any implications with discharge to the surface drains or any surface water (e.g. stormwater from Anaerobic Lagoon or directly to site drain). Mitigate any of these issues by isolation wherever possible. 3. If isolation is not possible and the condition persists, the WWTP can be shut down and relevant controls implemented to transfer incoming effluent to the Irrigation Storage Lagoon. 4. Take photos and document the event. These can be sent to the Wastewater Technical Expert to determine the best course of action. 5. Implement any actions as advised by the Wastewater Technical Expert. 6. Ensure the WWTP is restarted, and the equipment and walkways washed down and fully functional (e.g. level transmitters fully functioning with no errors). 7. Document the event and notify the Environment Southland if required under the consent conditions.

Table 6: Contingency and Response Procedures	
Event/Risk	Contingency/Response
	<ol style="list-style-type: none"> Haul the aerators and mixers to the Otterdock pontoon and hose them down to clear any foam deposits.
<p>POWER OUTAGES MANAGEMENT</p> <p>In the event of a power outage (scheduled or unscheduled), the WWTP will have limited ability to transfer wastewater into the treatment plant and continue to have complete treatment in the event of extended outage.</p> <p>This section set out the procedures to undertake and the escalation process when the power outages extend beyond 48 hours at the site.</p>	
Power Outage	<p>Contingency:</p> <p>WWTP site outage only</p>
	<p>Response:</p> <p>In the event of a power outage, the duty WWTP Operator shall:</p> <ol style="list-style-type: none"> Ensure that it is a mains power outage (not a local issue within the WWTP site). Ensure that all key system operation is functioning correctly, by checking for any specific alarms on the HMI/site SCADA and do a physical walk over for confirmation. Repeat this process once mains power has been restored.
	<p>Contingency:</p> <p>Site Wide Extended Outage</p>
	<p>Response:</p> <p>In the event of a site wide power outage, the duty WWTP Operator shall undertake the following steps:</p> <ol style="list-style-type: none"> Close the inter-connecting valve between Covered Anaerobic Lagoon and the SBR to stop discharges from anaerobic lagoon entering the SBR. Ensure that wastewater received into the Flow Equalisation Basin (FEB) is at lower level. If the FEB is high, then observe the odour risk from this pre-anaerobic lagoon storage basin. If odour risk is high, then manually transfer the wastewater from FEB to anaerobic lagoon, by breaking into the delivery line and utilising a temporary by-pass. Utilise a fuel powered pump.

Table 6: Contingency and Response Procedures

Event/Risk	Contingency/Response
	<ol style="list-style-type: none"> <li>3. Using a fuel powered pump, transfer stormwater from the cover of Anaerobic Lagoon into the Irrigation Lagoon. Keep stormwater off the lagoon cover. <li>4. Observe biogas generation under Covered Anaerobic Lagoon and store the biogas until the cover is uplifted above the water level. Once the cover is uplifted and starts to inflate across the lagoon, open the by-pass valve to discharge via the biofilter as passive discharge. Ensure biofilter has hydrated lime added when by-passing biogas to biofilter. <li>5. In the event the outage extends beyond 48 hours, manually connect the smaller Aerator in the Irrigation Lagoon to a generator and aerate the Irrigation Lagoon. <li>6. Transfer the water from the SBR into the Irrigation Lagoon until low level is reached in the SBR. The low level will be denoted by the Otter Dock resting firmly on the anchor blocks at the crest. <li>7. Keep irrigation Lagoon aerated with directly powered generator. Use a fuel powered pump to transfer aerated water into the SBR until high level is reached. <li>8. Discharge the SBR water back into Irrigation Lagoon to keep water aerated water both in Irrigation Lagoon and higher dissolved oxygen water in the SBR. <li>9. .In the event the Irrigation Lagoon is at high water level, manually connect one of the irrigation pumps to discharge irrigation water onto land.

7.0 Monitoring

Monitoring confirms the satisfactory operation of the WWTP and confirms that the discharge from the WWTP complies with the conditions of the Resource Consent and that these discharges are not having adverse impacts on the surrounding environment. This section only covers the monitoring requirements for the final effluent discharge under Consent No. 201191 and does not cover the consent requirements for surface water or soil sampling which are also stipulated under the same consent.

Additionally, this section covers the monitoring requirements under Discharge Permit AUTH-20181937-03 for the discharge of groundwater (land drainage water) to the site drain. The relevant consent documents are attached as Appendix F.

All plant monitoring shall be done by a fully trained and qualified plant operator or by an appointed external expert. All analyses shall be carried out by a laboratory with IANZ accreditation or equivalent. All persons undertaking sampling for monitoring purposes must be aware of the relevant treatment components and processes, and how they can affect sampling quality, consistency and strategy. With regular monitoring, any developing problems will be identified early, before they cause major problems.

7.1 Treated Effluent Consent Limits

The consent does not specify limits for individual treated effluent quality parameters except Sodium Adsorption Ratio. However, it does specify the permitted maximum daily discharge rate and the annual nitrogen loading rate to land. Table 7 highlights the key consent requirements.

Table 7: Key Resource Consent Requirements	
Parameter	Trigger Level
Maximum Rate of Discharge	1,000 m ³ /d
Annual Nitrogen Loading (assuming cut and carry)	450 kg/N/ha
Annual Nitrogen Loading (all other areas)	350 kg/N/ha
Maximum Wastewater Sodium Adsorption Ratio	17

In addition to the above requirements, effluent shall be sampled and analysed at minimum on a monthly basis. Effluent samples shall be collected from the sampling valve on the Decant Pump Station pipework at the mid-point of a decant cycle (when P3 is running). Table 8 shows the parameters to be analysed.

Table 8: Treated Effluent Sampling Parameters	
Quality Parameter	Unit
cBOD ₅	mg/L
pH	pH units
EC	dS/m
TSS	mg/L
NH ₄ -N	mg/L
TN	mg/L
TP	mg/L
DRP	mg/L
Oil and Grease	mg/L
<i>E. coli</i>	cfu/100 mL
Calcium	mg/L
Magnesium	mg/L
Sodium	mg/L

Although not a direct condition of the discharge consent, flow monitoring and recording of daily flow volumes from P3, WAS (P5) and effluent discharged to land shall be kept.

7.2 Groundwater and Surface Water Sampling

Groundwater discharging from the sub-soil drain shall be sampled for the parameters outlined in Table 9, in accordance with Condition 4 of Resource Consent AUTH-20181937-03. The grab samples are to be taken from:

- MH1.
- The surface water 5-20 m upstream of the discharge to the site drain (to the South East of the Irrigation Storage Lagoon).

These samples shall be collected within two hours of each other. This sampling shall be conducted annually in accordance with Condition 4(c) of Resource Consent AUTH-20181937-03.

Table 9: Groundwater and Surface Water Sampling Parameters	
Quality Parameter	Unit
cBOD ₅	mg/L
pH	pH units
EC	dS/m
NH ₄ -N	mg/L
NO ₃ -N and NO ₂ -N	mg/L
TP	mg/L
<i>E. coli</i>	cfu/100 mL
Temperature (Field Measurement)	°C

The laboratory analysis results are to be submitted with a report to the consent authority (email: escompliance@es.govt.nz) within 30 days of receipt. The report shall include:

- The location of the samples.
- Comparison of the land drainage water and the water in the drain.
- Comments on any contamination of the land drainage water samples by wastewater.

Note: contamination of the land drainage water with wastewater is most likely to be indicated by elevated *E. coli*. For guidance on indicators of wastewater contamination, contact the Wastewater Technical Expert.

7.3 Other Monitoring Requirements

For effective WWTP operation, conduct the following monitoring procedures outlined in Table 10.

Table 10: Monitoring of WWTP Parameters for Effective WWTP Operation			
Monitoring	Description	Monitoring Frequency	Monitoring Timeframe
SBR MLSS concentration	<ul style="list-style-type: none"> Take a TSS sample from the SBR during the aerate phase. Evaluate MLSS concentration to aid in determining the correct wasting rates. 	Once per week	First six months of operation; First three months of each new operating season
Anaerobic Lagoon cBOD ₅ removal performance	<ul style="list-style-type: none"> Take a cBOD₅ sample from the transfer pipe between the Covered Anaerobic and SBR Lagoons. Determine if effective BOD removal is occurring. Measure the field temperature for the grab sample immediately. 	Once per month	On-going
Site Drain	<ul style="list-style-type: none"> Observe/record any visible changes to the normal appearance of the water e.g. discoloration plume, a film or foam/scum on the surface, objectionable odour. 	Once per week; During groundwater and surface water sampling	On-going
Lagoon Leak Detection System	<ul style="list-style-type: none"> Take a sample from MH2 connected to the leak detection system. An IANZ accredited laboratory must test samples for NH₃-N and <i>E. coli</i>. <p><u>If <i>E. coli</i> < 10³ cfu/100 mL and NH₃-N < 10 g/m³:</u></p> <ul style="list-style-type: none"> Valve can be opened, and groundwater discharged. Valve is to be closed once the chamber has drained. <p><u>If <i>E. coli</i> > 10³ cfu/100 mL and NH₃-N > 10 g/m³:</u></p> <ul style="list-style-type: none"> Contact the Wastewater Technical Expert 	Once every three months	On-going

Table 10: Monitoring of WWTP Parameters for Effective WWTP Operation			
Monitoring	Description	Monitoring Frequency	Monitoring Timeframe
Biogas Diversion to Biofilter	<ul style="list-style-type: none"> If biogas is passed through the biofilter, the date, time and reason (e.g. biogas flare failure or maintenance) must be recorded and reported as per Section 10.2. 	Every occurrence	On-going
Lagoon Embankments	<ul style="list-style-type: none"> An inspection of the embankments must be conducted by the WWTP Engineer to check for cracks, holes, defects. Photographs of the structure must be taken. A record for the annual inspections (including photographs) is to be maintained. <p>If there is any indication that the structures are not structurally sound (e.g. leakage, slumping, hollows, bulges, or defects on either the inside or outside walls):</p> <ul style="list-style-type: none"> Seek specialist advice immediately. Notify Environment Southland within 48 hours (in accordance with Condition 7 of Resource Consent AUTH-20181937-01). 	Annually	On-going
Lagoon Embankments	<ul style="list-style-type: none"> A suitably qualified person is to inspect the lagoon embankments to confirm that the structures have no visible cracks, holes, or defects that would allow effluent leakage. If defects are found, notify Environment Southland in accordance with Condition 6 of Resource Consent AUTH-20181937-01. 	Once only	2022

8.0 Nuisances and Complaints

8.1 Odours and Spray Drift

Under normal operation, odours and spray drift from the site should be negligible and not perceivable beyond the perimeter fence boundary. If an odour or spray drift complaint is received, the complaint must be investigated immediately along with an investigation of the likely source and mitigation measures as detailed:

1. Visit the address of the complainant.
2. Note the wind direction and the likely direction of the source.
3. Note the characteristics of the odour, intensity and any objectionable nature of the odour.
4. If the odour is likely to be coming from the WWTP, investigate the potential source and mitigate in accordance with Section 5.0.
5. Record the complaint as per Section 8.4.

8.2 Noise

Under normal operation, noise from the site (pumps and aerators) is unlikely to be a cause of complaint. However, in the case of a plant malfunction there is the potential for excessive noise production, therefore it is essential that the WWTP maintenance is adhered to.

If a noise complaint is received, the following action shall be undertaken:

1. Identify the noise source if from the WWTP.
2. If the noise is caused by a mechanical part of the WWTP, determine if the noise is 'abnormal'. If abnormal, turn 'noisy' equipment off and call an appropriate service technician.
3. Report the complaint as per Section 8.4.

8.3 Pests and Vermin

Vermin can become established at WWTP sites. However, vermin risk at the WWTP is not expected to be increased relative to the wider Blue Sky Pastures site. Regular poison baiting shall be conducted which will control vermin under most circumstances. If vermin population appears to be increasing, then a more intensive vermin control programme may be necessary thus seek expert advice.

Historically, gulls have been noted to congregate near the WWTP in large numbers. This congregation must not be allowed within the WWTP site, especially on the Anaerobic Lagoon cover as bird faeces will contaminate the stormwater discharge.

8.4 Recording of Nuisances and Complaints

All complaints are to be recorded in a “Complaint Form” (see Appendix E), this shall include a record of:

1. Time and type of complaint including details of the incident (e.g. duration, location and any effects noted).
2. Name, address and contact phone number of the complainant (if provided).
3. The weather conditions including wind direction, wind strength and temperature at the time of the incident.
4. The likely cause of the complaint and the response made by the consent holder (including any corrective action taken).
5. Future actions proposed as a result of the complaint.
6. The response from the consent holder to the complainant.

The complaint log (or ‘diary’) shall be made available to Environment Southland upon request.

9.0 Notification of Non-Compliance

The Health Safety and Environment Manager shall notify Environment Southland whenever a consent condition is breached due to any accidental discharge, plant breakdown, or other circumstances which have, or are likely to result in the performance standards of the Resource Consent being exceeded.

The procedure for non-compliance reporting is to be as specified in the applicable Resource Consent, however should always include:

1. Investigate the cause of the non-compliance.
2. Take steps to remedy any problems and engage specialist advice if required.
3. Provide notification to Environment Southland as soon as practicable and within 24 hours.
4. Provide written notification and detail to Environment Southland within 7 days of the event occurring.

10.0 Reporting and Record Keeping

10.1 Routine Maintenance and Repairs

Operators shall make direct reference to the specific manufacturer's instructions and this O&M manual with regards to all maintenance and repair events. All maintenance and repair events shall be logged on a digital system that is centrally linked for external access. Each log must include but is not limited to:

- Date and time of maintenance/repair.
- Staff member and/or company undertaking maintenance/repair.
- Item serviced/repaired (including specific item numbers and models).
- Whether the maintenance/repair event is routine or an emergency.
- A full system check after maintenance/repair and all alarms cleared (if present).
- Inventory status of any spare parts (e.g. bearings, lubricants, spare pumps).
- The next scheduled date for maintenance.

Any significant repairs or maintenance events shall be reported to the General Manager Operations and distributed amongst all WWTP Operators within 24 hours of occurrence.

10.2 Monitoring Data

All sampling and monitoring results and records as required by this O&M Manual shall be made available to Environment Southland in an organised format.

Additionally, the following reporting is required:

1. The effluent sampling for the WWTP shall become part of the annual report required for the consent conditions under the existing Consent No. 201191.
2. For all groundwater (land drainage water) and surface water sampling, BSP shall report the results in writing to Environment Southland (escompliance@es.govt.nz) within 30 days of the receipt of the sample results. The report shall include:
 - The location of the samples.
 - Comparison of the land drainage water and the water in the drain.
 - Comments on any contamination of the land drainage water samples by wastewater.

3. If the biofilter is used for biogas discharge (as opposed to the biogas flare) for more than 20 days in the calendar year ending 31 December, then a report specifying the dates and reason for these occurrences must be submitted to Environment Southland within 60 days.

Appendix A: WWTP Functional Description

Appendix B: EIS WWTP HMI Manual

Appendix C: Daily Operation & Maintenance Checklist

Appendix D: WWTP General Maintenance Schedule Summary

Appendix E: Complaint Form

Appendix F: Relevant Resource Consents