

**BEFORE ENVIRONMENT SOUTHLAND
AND SOUTHLAND DISTRICT COUNCIL**

UNDER the Resource Management Act
1991

IN THE MATTER of a Resource Consent
Application and Designation by
Southland District Council to
discharge treated wastewater to
land and odour to air from the Te
Anau Wastewater Treatment
Plant

**STATEMENT OF EVIDENCE OF SIMON HERBERT BEALE
FOR SOUTHLAND DISTRICT COUNCIL**

**ANDERSON LLOYD
LAWYERS
DUNEDIN**

Solicitor: M R Garbett

Level 10, Otago House
Cnr Moray & Princes Street,
Private Bag 1959,
DUNEDIN 9054
Tel 03 477 3973
Fax 03 477 3184

QUALIFICATIONS AND EXPERIENCE

1. My name is Simon Herbert Beale.
2. I am currently employed as a Senior Environmental Planner and Senior Environmental Scientist with MWH New Zealand Limited.
3. I hold a Bachelor of Science degree in Zoology (1981) from the University of Otago and a Bachelor of Forestry Science degree (1983) from the University of Canterbury. My work experience spans the fields of resource planning and terrestrial ecology. This includes baseline site investigations, resource consent applications, District Plan reviews and ecological impact assessments. I also have extensive experience project managing multi-disciplinary teams of specialists.
4. I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note. This evidence has been prepared in accordance with it and I agree to comply with it. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

SCOPE OF EVIDENCE

5. I have been asked to prepare planning and terrestrial ecology evidence in relation to the discharge of treated wastewater to land and odour to air from the Te Anau Wastewater Treatment Plant. In my evidence I will describe:
 - a. The status of the resource consent applications;
 - b. A summary of submissions received in response to notification of the applications;
 - c. The actual and potential effects of the proposed discharge on visual amenity values, cultural values and terrestrial ecology values;
 - d. The bird strike assessment prepared for Te Anau airport and the Civil Aviation Authority (CAA);

- e. The relevant provisions of National Environmental standards, Regional Policy Statements, Regional Plans and other planning documents;
- f. The relevant provisions of the Resource Management Act 1991 (RMA), including Part 2;
- g. A list of proposed consent conditions forms Appendix 1 to my evidence; and
- h. Appendix 2 to my evidence lists the relevant objectives and policies of the National and Regional Policy Statements, Regional Plans and Te Tangi a Taura.

STATUS OF THE APPLICATIONS

Rules

- 6. The applications of the Southland District Council seek resource consent for the discharge of treated wastewater onto land in accordance with Rule 5.2.1 of the Regional Effluent Land Application Plan and resource consent for the discharge of odour to air in accordance with Rule 5.5.3 of the Regional Air Quality Plan.

Section 104: Consideration of Applications

- 7. Section 104(1) of the RMA sets out matters that a consent authority must have regard to, subject to Part 2 RMA when considering a resource consent application and any submissions received. These include:
 - a. Any actual or potential effects on the environment of allowing the activity;
 - b. Any relevant provisions of:
 - i. A national environmental standard;
 - ii. A national policy statement;
 - iii. A regional policy statement or proposed regional policy statement; and
 - iv. A plan or proposed plan.

- c. Any other matter the consent authority considers relevant and reasonably necessary to determine the application.

ACTUAL AND POTENTIAL EFFECTS ON THE ENVIRONMENT

8. In this section of my evidence I address the effects of the proposed discharge on visual and amenity values, cultural values, and terrestrial ecology values. The assessment of effects of the discharge on soil, groundwater quality, surface water quality and air quality have been addressed in the evidence of Dr Davoren, Mr East, Ms Bennett and Mr Lockyer respectively.

Effects on Visual Amenity Values

9. In assessing the effects of the discharge on visual amenity values I also rely on the evidence of Dr Tony Davoren in terms of describing the size, form and construction materials of the centre pivot irrigators and Mr Lockyer in terms of other support structures and buildings.
10. The evidence of Dr Davoren has allowed me to assess the visibility of the centre pivot irrigators from various public viewpoints. I have determined these viewpoints to be Te Anau airport terminal, the airport runway, approaches to the airport from the air and State Highway 95 (SH95) north and south of the airport intersection.
11. I am of the opinion that the installation of centre pivot irrigators and associated infrastructure will have no more than a minor effect on the visual amenity of the rural environment encompassing the Kepler Farm and the land surrounding the farm. The reasons are:
 - a. Centre pivot irrigators and supporting facilities including tanks and small buildings are a feature of the rural farming environment especially where there are expansive areas of improved pasture such as occurs within the Kepler Farm and Kepler Block.
 - b. With the exception of the view plane to the southwest of the irrigation area, the pivot irrigators will be screened from public viewing points such as SH95 north of the airport intersection by shelterbelts of radiata pine.

- c. Despite the size of each of the pivot irrigators (5 metres high and 345 metres in length) the degree of intrusion on the landscape when viewed from the airport terminal and other viewpoints to the south west will be lessened by a separation distance of at least 350 metres and minimal reflectivity due to the galvanised steel construction. The backdrop of shelterbelts across the Kepler Farm surrounding the irrigation area and the more distant backdrop of the Ramparts escarpment will assist in reducing the visibility of the pivot irrigators when viewed from the airport terminal. I note that a shelterbelt to the south of the airport with a north-south axis will afford some screening to residents in the Moturau subdivision by SH95.

Effects on Cultural Values

12. In assessing the effects of the discharge on cultural values I rely on the evidence of Ms Bennett, which describes the potential effects of the discharge on surface water receptors.
13. In her evidence Ms Bennett describes the likely concentration of nitrate nitrogen in the Waiau River downstream of the reach where diffuse groundwater discharge is expected to occur. The location of the discharge is a south west trending reach of the Waiau River determined from the groundwater pathways assessment undertaken by Mr East. Ms Bennett notes that the concentration of nitrate nitrogen will be below the level of detection at or about 200 metres downstream of the discharge. She concludes that the effect of the discharge on water quality and aquatic ecosystems in the Waiau River will be less than minor.
14. On the basis of the evidence of Ms Bennett and SDC's decision to discharge treated wastewater to land at the Kepler Block as opposed to continuing to discharge treated wastewater to the Upukerora River I am of the opinion that the effects of the discharge on cultural values will be less than minor.
15. I have taken into account Ngā Kaupapa objectives and policies concerning wastewater discharges contained in Te Tangi a Taurira and those concerning Mauri and Mahinga Kai in Ngāi Tahu's fresh water policy statement. These objectives and policies emphasise the

undesirability from a cultural perspective of point source discharges of contaminants such as human wastewater to waterways.

16. I have also reviewed the NZ Archaeological Association's (NZAA) Recording Scheme to determine whether any recorded sites of archaeological importance occur in the vicinity of the Kepler Block. The "ArchSte" GIS that supports the recording scheme shows that no recorded sites occur within or in close vicinity to the Kepler Block.
17. I note that Te Ao Marama has provided a submission in support of the SDC application.

Effects on Terrestrial Ecology Values

18. I confirm that this section of my evidence is within my area of expertise. I am familiar with the sites of ecological value in the vicinity of the proposed irrigation area. These are the Kepler Mire and Home Creek. The Kepler Mire is a large raised mire occupying a prominent old meltwater channel to the east of the irrigation area which is of international significance. The mire is connected to Home Creek, a slow meandering waterway that is bordered by extensive wetlands. The Kepler Mire is classified as a stewardship area in accordance with the Conservation Act 1987 while much of Home Creek and fringing wetlands lies with the Home Creek Wildlife Management Reserve. The wetlands on the north side of the creek adjoin the Kepler Block.
19. In assessing the effects of the proposed discharge on terrestrial ecology values I rely on the evidence of Mr East and the evidence of Dr Davoren, the latter concerning the potential for surface water or overland flow to be generated from the irrigation area during intense or prolonged rainfall events.
20. Effects of the proposed discharge on birds are addressed in the next section of my evidence, which outlines the bird strike assessment.
21. In his evidence Mr East states that, based on current understanding of the local geology and hydrogeology the most likely groundwater flow pathway is in a north-west direction from the irrigation area towards the Waiau River rather than in an easterly to south-easterly direction towards the Kepler Mire and Home Creek. Mr East adds that groundwater discharge to the Kepler Mire is an impossibility as the depth of groundwater below the irrigation area is approximately 20

metres below the Kepler Mire. Mr East considers a discharge to Home Creek is very unlikely as groundwater flow directions would have to change significantly from the existing situation.

22. In his evidence Dr Davoren describes how the pivot irrigators will be operated during summer and winter conditions to ensure maximum infiltration of treated wastewater into the ground. He describes the free draining nature of the soils that underlie the irrigation area and cites the lysimeter tests he undertook which indicates minimal lateral movement of infiltrated water within the unsaturated soil and sub-soil zone. He notes that precision of pivot irrigator operation and the free draining nature of the soils minimises the opportunity for treated wastewater to remain on the surface beneath the irrigators even during an intensive rainfall event. In the unlikely event that ponding were to occur, Dr Davoren noted that any ponded wastewater would drain away rapidly. He added that as a precautionary measure the irrigator operation could be ceased before or during an exceptionally intense rainfall event.
23. With respect to the peat bog within the irrigation area where localised impeded drainage occurs, Dr Davoren noted in his evidence that this will be irrigated sparingly to ensure the health of the peat bog is maintained.
24. On the basis of the evidence of Mr East and Dr Davoren I am of the opinion that the effects of the proposed discharge on the Kepler Mire and Home Creek would be "de minimis". I note that some submitters have suggested that spray drift will occur and lead to atomised treated wastewater reaching pasture beyond the irrigation area, which will then be washed off during heavy rain and flushed into one or more meltwater channels draining into Home Creek. In reply through his evidence Dr Davoren explains that pivot irrigator design and operation is based on best industry practice, including the generation of large droplets from the irrigator sprinklers that minimises any opportunity for generation of spray drift under most weather conditions. Further information on the measures taken to minimise spray drift and maximise soil infiltration within the irrigation area are addressed in the Environmental Management Plan (EMP).

BIRD STRIKE RISK ASSESSMENT

25. I confirm that this section of my evidence is within my area of expertise.
26. I was responsible for preparing the bird strike assessment for review by Te Anau Airport Committee and the CAA. In undertaking the assessment I reviewed the relevant CAA guidance material concerning land use at or near airports, consulted with the airport manager regarding resident and seasonal bird species and current management measures undertaken by the airport as well as reviewing literature concerning habitat requirements of observed species. I have also relied on the evidence of Dr Davoren concerning the potential for ponding during centre pivot irrigator operation and pasture management.
27. The bird strike assessment recommends a range of passive deterrence measures within the irrigation area which I consider represent the best practicable means of managing birds and minimising the level of risk posed to aircraft from the proposed irrigation activity. These are:
- a. Pasture management:
 - i. Maintaining a minimum grass height of 50-70 mm during the growing season and 150-200 mm during winter beneath the pivot irrigators which birds find undesirable for feeding and nesting; and
 - ii. Maintenance of the grass sward within the irrigation area to avoid seed head development.
 - b. Avoidance of prolonged ponding within the irrigation area through precision irrigation afforded by the centre pivot irrigators;
 - c. Absence of lighting within the irrigation area including absence of strobe lighting on the centre pivot irrigators; and
 - d. Use of birds scaring devices such as percussion noise scarers.
28. I note that the bird management measures proposed for the irrigation area will exert a level of control on bird numbers in the vicinity of the airport that currently does not exist under the current farming regime.

29. Specific literature that was used or relied upon in support of the opinions I have expressed concerning bird management and mitigation of the bird strike risk are:
- a. CAA Advisory Circular 139-16;
 - b. CAA Guidance material for land use at or near aerodromes;
 - c. Field Guide to the Birds of New Zealand; and
 - d. Atlas of Bird Distribution in New Zealand.

NOTIFICATION / SUBMISSIONS

30. The resource consent application seeking the discharge of treated wastewater to land and odour to air was publicly notified on 16 November 2013. This attracted 158 submissions 150 of these in opposition. In this section of my evidence I have listed the concerns raised by submitters, which I address in turn.

The effect of high nitrogen loading arising from the discharge on groundwater and surface water (Waiau River, Lake Manapouri, Kepler Mire and Home Creek).

31. The effect of nitrogen leaching to groundwater due to the discharge of treated wastewater on groundwater users has been addressed in Mr East's evidence. Mr East notes that the elevation in the nitrogen concentration in groundwater down gradient of the irrigation area has the potential to affect receptors such as the well at Te Anau airport used for domestic water supply. He has explained that groundwater levels and quality will be monitored in selected up and down gradient wells to confirm the groundwater flow direction more precisely and the extent of the contaminant plume.
32. Mr East has assessed the depth of the groundwater across the irrigation area which in combination with his assessment of the local geology determined that the direction of the groundwater flow from the irrigation area is towards the Waiau River. He concludes that groundwater flow in the direction of the Kepler Mire is impossible and in the case of Home Creek very unlikely.

33. Mr East has also identified the possibility that groundwater could flow in the direction of Frasers Beach, Lake Manapouri but considers this to have a low risk of occurrence.
34. In her evidence Ms Bennett describes the mass balance approach to calculating the concentration in the Waiau River following full mixing of the groundwater plume. Her assessment shows that no detectable change in the water quality of the Waiau River is expected as a result of the diffuse discharge. Effects on aquatic ecosystems are likely to be less than minor. With respect to Lake Manapouri Ms Bennett considers the risk of groundwater discharge having any potential adverse effects on Lake Manapouri would be less than minor.

The effect of the discharge on water supplies, including wells, airport well and Manapouri supply from Lake Manapouri.

35. The potential effect of the discharge on water supplies and proposed mitigation measures has been addressed in the application and in the evidence of Mr East. The mitigation measures are further elaborated on in the EMP. These seek to protect the water supply wells by providing an early indication of groundwater contamination immediately down gradient of the irrigation area through the provision of a monitoring well between the irrigation area and the airport terminal. In the event that an increase in nitrate nitrogen is detected the SDC will initiate further monitoring which may include the provision of additional monitoring wells as documented in the EMP.
36. The EMP sets a trigger level for nitrate nitrogen of 50% of the drinking water standard. If this is exceeded the EMP sets out action that the SDC will undertake commencing with investigation of the cause and remedial measures that may be required to address the cause. .
37. In the unlikely event that the contaminant plume was to extend as far as the airport well due to lateral dispersion, the SDC will consider provision of an alternative potable water supply to the airport terminal complex.

The degree of uncertainty about contaminant flow paths and impact of earthquakes on flow paths.

38. I consider the groundwater investigations undertaken by Mr East are robust and provide a high level of certainty that all the potential

groundwater flow paths have been identified. I note that Mr East has assessed the local geology and hydrogeology in detail as part of his investigations.

The effects of odour on residents, airport workers, visitors, tourists, and users of the state highway.

39. The SDC has taken the concerns expressed by the local community about odour seriously and proposes to establish odour treatment facilities on site. The specific treatment facilities are a trickling filter and a soil bio-filter. Chemical dosing of the outflow from the trickling filter may also take place as part of the treatment process to oxidise any residual odour generating sulphide gases. These measures have been described in detail in Mr Lockyer's evidence and in an odour management plan that has been prepared as an Appendix to the EMP.

The effects of spray drift carrying pathogens on residents, airport workers and roof water supplies and corrosion risk to aircraft.

40. In my evidence I have referred to the design and operation of the centre pivot irrigators drawing on the evidence of Dr Davoren. Dr Davoren explains that the irrigators are designed to minimise the potential for spray to drift beyond the irrigators' wetted footprint under most climatic conditions. He refers to the large droplet sizes generated by the sprinklers and height of the sprinklers that optimise pasture interception. Dr Davoren notes that spray drift can occur in high winds and accordingly recommends procedures to prevent drift affecting land beyond the irrigation area. This includes temporary cessation of irrigation during high winds as noted in the EMP. The EMP outlines the operational /management responses that will be implemented to minimise the potential for spray drift to travel beyond the irrigation area during adverse climatic conditions.
41. The shelterbelts along three of the four boundaries of the irrigation area (including establishment of an additional tier to each shelterbelt) will assist to reduce wind speeds within the irrigation area and to intercept droplets in the unlikely event that they become atomised and drift away from the irrigators.

The effects of the activity on airport viability, the local economy and image and NZ's 100% pure/clean brand.

42. The concerns expressed by a number of submitters in this context is understandable.
43. The SDC has acknowledged that odour is a real concern and is addressing this through provision of odour treatment facilities as previously discussed.
44. In a wider sense I consider the discharge of treated municipal wastewater to land is environmentally preferable to discharging to a river and is more consistent with our clean green image.
45. This application is in my opinion, consistent with the objectives of the National Policy Statement for Freshwater Management 2011 and follows the lead taken by other local authorities around the country in discharging treated wastewater to land.

The application lacks detail and includes too many assumptions and uncertainties. There is a lack of baseline data and an absence of EMP and operational plans.

46. The SDC has taken on board the concerns expressed by a number of submitters and attendees at the open days held at Te Anau airport. A draft EMP and odour management plan has consequently been circulated to submitters on 30 May 2014. The documents were loaded on the SDC website for wider public viewing. The release of these documents at this time provided submitters the opportunity to review these plans and submit on these through their evidence presented to this hearing.
47. In terms of baseline data, the monitoring of groundwater quality beneath and up gradient of the proposed irrigation area commenced in January 2013 and is ongoing.
48. I consider that monitoring of the soil chemistry within the irrigation area is warranted and will provide baseline data to assess the physio-chemical effects of the irrigation activity. However, monitoring of soil fauna within the proposed irrigation area is in my opinion unwarranted and will serve no useful purpose. I am familiar with the effects of disposal of wastewater to land on soil fauna through my involvement with the annual bio-monitoring programme within the Stewart Island

wastewater disposal area. The results of that programme show that the irrigation of treated wastewater has caused a gradual change in the composition of soil dwelling taxa at the expense of taxa that are unable to adapt to elevated soil moisture levels. The results have provided no evidence of cumulative adverse effects or adverse effects related to changes in soil chemistry.

There is a lack of consideration of alternatives such as investigating other disposal sites closer to Te Anau and treating wastewater to a higher standard either at the treatment plant (Option D) or using other technologies such as bio-dome sewage systems.

49. Since the granting of the resource consent in 2004 the SDC has embarked on extensive investigations into alternative treatment and disposal options. This was a requirement of condition 20 of the resource consent 202636 which states:

By 30 September 2005, and annually thereafter, the consent holder shall report to the Southland Regional Council's Environmental Compliance Manager on progress towards developing and implementing the long-term wastewater and disposal solution for the Te Anau township. The annual reports shall include, but not be limited to, the following information:

- (a) progress on the assessment of treatment and disposal options considered, including the consent holder's preferred option. As a guide, the assessment and identification phase is to be completed by 1 October 2009;*
- (b) any decisions about the future utilisation, or otherwise, of the current Te Anau Wastewater Treatment System;*
- (c) an overview of discussion about the treatment and disposal system carried out between the consent holder and any affected and/or interested persons;*
- (d) the work that the consent holder intends to carry out over the next 12 months in order to progress the implementation of the long-term strategy for the treatment and disposal of Te Anau's wastewater.*

50. Potential land disposal sites were investigated throughout the Te Anau Basin as documented in the application and in the reports prepared by MWH in 2007 and by HydroServices in 2013. Areas investigated in the vicinity of Te Anau were discounted due to insufficient land area, a lack of flat land, the price of the land and presence of streams and drains.
51. Treatment options such as Option D were discounted on the basis of cost. Other treatment measures promoted by submitters such as bio-dome sewage systems were discounted as these are technologies new to New Zealand and therefore unproven. More importantly they only deal with treatment of nitrogen and therefore do not provide the complete treatment solution.

There is a lack of contingency planning dealing with events such as earthquakes and severe weather events. The 3 day storage capacity of the oxidation ponds is insufficient.

52. The EMP includes a chapter titled Emergency Management that outlines contingency measures that will be implemented by the SDC in the event of a natural disaster or major climatic event.
53. For example telemetered flow meters will be installed at either end of the rising sewer main which will signal the pump station to shut down if there is a sudden change in pressure that might be caused by a pipeline rupture during an earthquake.
54. The SDC is aware of the potential for surface water flooding to occur as a result of intense rainfall events, as evident from aerial photos supplied by several submitters and by Environment Southland. These show extensive ponding across the Kepler Farm following intense rainfall on 9 September 2002. I understand a similar event occurred in August 1984. In this regard monitoring of weather forecasts and real time data provided by the weather station at Te Anau airport form an important part of the monitoring programme documented in the EMP. In the event that a severe rainfall is issued by the MetService, the SDC will temporarily cease operation of centre pivot irrigators. The timing of cessation and recommencement of irrigator operations will be dependent on confidence levels provided by the MetService and the data provided by the Te Anau airport weather station prior to, during and following the event. Mr Oakley refers in his evidence to a

storage capacity of between 1.6 to 3.5 days during maximum summer and winter flows encountered in 35 years' time. This represents a worst case scenario.

The potential for the discharge to cause ponding and surface run-off due to underlying iron pan and peaty soils.

55. I draw your attention to the evidence of Dr Davoren which includes reference to the free draining nature of the Monowai soils present across the proposed irrigation area. Dr Davoren notes that an underlying iron pan does exist but is confined to the peat bog situated within the eastern centre pivot irrigation area. The bog represents approximately 11% of the total area of the eastern irrigation area.
56. Dr Davoren advises that the irrigation operation can be controlled to a high degree so as to prevent ponding within the bog. This can be achieved he says by solenoid closure of sprinklers along the span of the irrigator as it passes over the peat bog. He adds that the sprinklers can be opened to periodically irrigate the bog in order to keep the peat in the bog at an optimum moisture level so as to maintain the health of the wetland plant community.

Increased risk of bird strike.

57. In my evidence I describe the risk of bird strike based on the assessment prepared for the airport management committee and CAA on the potential risks posed by the proposed discharge of treated wastewater by spray irrigation onto land adjacent to the airport. This assessment outlined the risk and measures that can be taken to minimise the risk of bird strike. The assessment raised no concerns with the CAA. The most appropriate measures advocated in the assessment are passive and focus on habitat management which is in line with recommendations contained in CAA Advisory Circular 139-16. Key facets of habitat management are maintenance of a tall grass sward within the irrigation area which is a deterrent to most bird species and prevention of prolonged ponding. The maintenance of a tall grass sward is consistent with the pasture management recommended by Dr Davoren in terms of maximising dry matter production for herbage harvest during the growing season.
58. I draw attention to a letter to Mr Ian Evans from the Manager of Te Anau airport, Mr Evan Pearce. In this letter Mr Pearce states that

currently the airport has little control of farming activity within the Kepler Farm which makes it difficult to monitor, manage and control bird activities. The increased risk of bird strike according to Mr Pearce occurs when the land is cultivated near the airport. Mr Pearce states that the proposed irrigation activity represents a more controlled land use which he suggests will result in less large bird activities in the area.

The 35 year term sought is too long and does not allow for changes in technology.

59. A consent duration of 35 years sought by the application provides Council with a good degree of financial security in light of the large capital investment required for a project of this nature.
60. The term sought does not discount the possibility that changes in technology may result in changes in the way that the scheme is operated that may improve the environmental performance of the scheme. For this reason the SDC is proposing a condition that requires a five yearly review of the treatment and irrigation system, including the nature of any improvements which could arise from technological changes or advances.

NATIONAL ENVIRONMENTAL STANDARD FOR SOURCE OF HUMAN DRINKING WATER

61. The National Environmental Standard (NES) came into effect on 20 June 2008. The purpose of the NES is to reduce the risk of discharges contaminating drinking water sources such as rivers and groundwater. The NES requires Council's to undertake a number of actions including imposition of conditions on relevant resource consents requiring notification of events that may adversely affect sources of drinking water.
62. Sources of drinking water that would be potentially be affected by the proposed discharge are bores used for domestic supply at Te Anau airport and at a residence located on Supply Bay Road to the west of SH95.
63. The proposed consent conditions to this application include monitoring of contaminants in the groundwater, including nitrate nitrogen. Should

contaminant concentrations, notably nitrate nitrogen concentrations increase to level that is considered a risk to public health (i.e. exceed NZDWS) the SDC will initiate remedial measures. These may include provision of alternative supplies to the affected parties. Further information on possible remedial measures is documented in the EMP.

NATIONAL AND REGIONAL POLICY STATEMENTS

National Policy Statement for Freshwater Management 2011

64. The National Policy Statement (NPS) for Freshwater Management took effect on 1 July 2011. The NPS sets out objectives and policies that direct local Government to manage water in an integrated and sustainable way, while providing for economic growth within set water quantity and quality limits. The NPS is a first step to improving freshwater management at a national level.
65. In analysing the NPS I consider Objectives A1, A2 and D1 of the policy statement to be of relevance to the proposed discharge.
66. Objective A1 is:
To safeguard the life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems of fresh water, in sustainably managing the use and development of land, and of discharges of contaminants.
67. Objective A2 is:
The overall quality of fresh water within a region is maintained or improved while:
- a) *protecting the quality of outstanding freshwater bodies*
 - b) *protecting the significant values of wetlands and*
 - c) *improving the quality of fresh water in water bodies that have been degraded by human activities to the point of being over-allocated.*

68. Objective D1 is:

To provide for the involvement of iwi and hapū, and to ensure that tāngata whenua values and interests are identified and reflected in the management of fresh water including associated ecosystems, and decision-making regarding freshwater planning, including on how all other objectives of this national policy statement are given effect.

69. I consider the application to be consistent with Objectives A1, A2 and D1. The reasons are:

- a. The termination of discharge of treated wastewater to the Upukerora River and Lake Anau will result in an improvement in water quality and protection of the ecosystem processes of these freshwater bodies;
- b. Tangata whenua values and interests will be met through the proposed discharge of treated wastewater to land. The SDC has consulted with Te Ao Marama with respect to this application. Te Ao Marama has provided a submission in support of the application.

Regional Policy Statement

70. The relevant provisions of the RPS are discussed below. The full text of these provisions is provided in Appendix 2 of my evidence.

Chapter 5.1 – Takata Whenua o Mirihiku: Objective 1.2

71. Objective 1.2 provides for the recognition of the importance of wahi tapu, wahi taoka, mahika kai and customary use of water to Kāi Tahu. Ceasing the direct discharge of treated wastewater to the Upukerora River in the future underlies SDC's understanding of the importance of the cultural values and uses of surface water bodies such as the Upukerora River to Kāi Tahu.

Chapter 5.2 – Biodiversity: Objective 2.2 / Policy 2.4

72. Objective 2.2 is concerned with maintenance and enhancement of biodiversity and Policy 2.4, avoidance, remediation and mitigation of adverse impacts on biodiversity and natural ecosystem processes.

73. The proposed discharge of treated wastewater to land at the Kepler Block will in my opinion affect the biodiversity of the soil fauna within

the areas that are being irrigated. I based this opinion on the long term vegetation and soil monitoring I have undertaken for SDC at the wastewater land disposal area at Oban, Stewart Island since 1999. This monitoring revealed that during the initial years of operation of the land disposal system there was a decline in the diversity of soil fauna. Landcare Research entomologists responsible for analysing the samples collected in the area conclude that the changes are likely to be a function of a change in soil moisture levels. The changes however were short term and no long term changes in soil taxa have been recorded.

74. As previously mentioned, the groundwater investigations show that the proposed discharge will not affect Kepler Mire or Home Creek.

Chapter 5.5 – Water Quality: Objective 5.1, Objective 5.2, Objective 5.3 / Policy 5.2, Policy 5.4, Policy 5.8

75. Objective 5.1 is concerned with sustaining the quality of the Region's water resources and their life supporting capacity. Objective 5.2 concerns maintenance of water quality and objective 5.3 / policy 5.2 require discharge of contaminants to water to comply with water quality standards. Policy 5.4 advocates land treatment of liquid wastes where these can be undertaken in a sustainable fashion and Policy 5.8 managing the Region's water resources to provide for Tangata whenua values.
76. In terms of surface water bodies the application aligns well with Objectives 5.1, 5.2 and 5.3 and policy 5.2 by ensuring the water quality of the Upukerora River is maintained and possibly enhanced in the absence of the discharge.
77. However the discharge will result in the decline in the quality of the groundwater down gradient of the proposed irrigation area as noted in Mr East's evidence. The investigations of groundwater flow and aquifer characteristics by Mr East suggest that the affected bores lie outside the influence of the contaminant plume. Further information on the groundwater flow direction and the aquifer will be gained through implementation of the monitoring programme proposed in the draft consent conditions and as part of the EMP.
78. The application is consistent with Policies 5.4 and 5.8 as this involves land treatment of wastewater as opposed to continuation of a point

discharge to a surface water body. The application also takes account of the values that Maori place on water as previously discussed.

Chapter 5.12 – Air Quality: Objective 12.1 / Policy 12.4

79. Objective 12.1 is about protecting the Region's air quality and policy 12.4 recognises Maori sensitivity to air quality issues.
80. The SDC has prepared an odour management plan which forms part of the EMP. This plan outlines filtering and site chemical dosing measures that will be implemented to prevent production of sulphide gases that could otherwise result in odour. Furthermore the design and operation of the centre pivot irrigators generating large droplets from the irrigator sprinklers in combination with real time climate monitoring will ensure that the potential for spray drift to be generated from the irrigators will be minimised. These matters have been addressed in the evidence of Mr Lockyer and Dr Davoren respectively.

Proposed Regional Policy Statement

Chapter 3 – Tangata whenua, Objective TW.3 and Objective TW.4

81. Objective TW.3 relate to sustaining or improving spiritual values and customary resources, including Mauri and Wairau. In my opinion the application aligns with this objective as it involves ceasing the discharge to the Upukerora River.
82. Objective TW.4 concerns the protection of sites of cultural significance. A review of the NZAA Recording Scheme through the Arch Site GIS platform shows that no sites of cultural significance occur near the irrigation area or other areas where earthworks will take place. However one recorded site denoted D43/13 is located near the intersection of SH95/Golf Course Road on the outskirts of Te Anau. The exact location of this site will require investigation prior to construction of sewer rising main.

Chapter 4 - Water Quality: Objective WQUAL.1, Policy WQUAL.1, Policy WQUAL.2, Policy WQUAL.5, Policy WQUAL.6 and Policy WQUAL.7

83. Objective WQUAL.1 concerns the provision of water quality goals for the region in order to safeguard life supporting capacity of water, its maintenance and enhancement where degraded and meeting the needs of future generations. The application is in part aligned with this

objective as there will be an improvement in water quality in the Upukerora River once the discharge to the river from the wastewater treatment plant ceases. However the discharge of treated wastewater to land at the Kepler Block will cause a decline in groundwater quality in the aquifer down gradient of the irrigation area.

84. Policy WQUAL.1 and Policy WQUAL.2 concerns maintenance and enhancement of surface water and groundwater quality and management of activities to reduce levels of nitrogen and phosphorus, sediment and microbiological contaminants. In his evidence Mr East describes the attenuation of contaminants, notably phosphorus, nitrogen and microbiological contaminants that will occur in the unsaturated zone within the irrigation area. He adds that during the winter months though nitrogen will leach into the groundwater. The degree and extent of the nitrogen contamination in groundwater will, according to Mr East be influenced by a number of factors including the hydraulic properties of the aquifer and climatic factors.
85. The application aligns with Policies WQUAL.5 and WQUAL.6 which concern the discharge of contaminants to land where adverse effects on groundwater and surface water quality are minimised. The evidence of Mr East concludes that there will be a decline in groundwater quality due to nitrogen leaching during the winter months.
86. While Mr East has explained that the likely groundwater flow is in a northwest direction from the irrigation area towards the Waiau River, he notes that the potential for contamination of the airport bore and a bore near Supply Bay Road which are used for domestic water supply purposes cannot be discounted. In his evidence he recommends the establishment of a network of monitoring bores to the west and south west of the irrigation area. This underlies the precautionary approach being advocated by Council of the potential risks of the discharge to community/domestic water supplies. This approach is inherent in the EMP which includes a section on groundwater monitoring and measures that will be undertaken in the unlikely event that contamination was detected in either bore, including the possibility of Council providing the affected users with an alternative supply.

87. Effects on surface water quality arising from the diffuse discharge of contaminated groundwater to the Waiau River have been assessed by Ms Bennett in her evidence as less than minor.

Chapter 9 – Air Quality: Objective AQ.1 and Policy AQ.1

88. Objective AQ.1 and Policy AQ.1 concern protection of human health and wellbeing from adverse effects of discharge of odour, chemicals, particulate matter and dust and avoidance where practicable of the adverse effects of discharges.
89. The control of odour is a matter which Council wishes to achieve as effectively as possible to minimise the potential for odour to affect persons beyond the irrigation area such as visitors to the airport. The evidence of Dr Davoren includes reference to Centre Pivot Irrigator operation and generation of large droplets to maximise interception by pasture and avoidance of spray drift generation. Secondly the evidence of Mr Lockyer deals with measures to treat odour producing sulphide gases that may be produced by anaerobic conditions prevailing in the sewer main that could be released into the atmosphere from the irrigators.
90. This two fold approach to odour management represents industry best practice. Odour management is documented in detail in the odour management plan along with contingency measures around climatic influences and adaptive operation of the centre pivot irrigators.

Chapter 16 – Infrastructure/Transport: Objective INF.1, Policy INF.1 and INF.2

91. Objective INF.1 and policies INF.1 and INF.2 deal with the provision and operation of critical infrastructure operation and integration with land use and means of avoidance, remediation and mitigation of adverse effects on the environment.
92. The proposed centre pivot irrigation system and supporting facilities will be a key facet of the Te Anau Wastewater Treatment Scheme and will be operated as efficiently as possible to ensure off site effects are avoided, remedied or mitigated. This includes the concentration of nitrogen leaching to groundwater and odour to air.

93. The pivot irrigation system is similar in appearance to many pasture and crop irrigation systems used throughout the country and is considered an integral part of rural land use.

REGIONAL PLANS

Regional Effluent Land Application Plan

Objective 4.1.1 and Policies 4.2.1, 4.2.2, 4.2.4, 4.2.7 and 4.2.10

94. Objective 4.4.1 and policies 4.2.1, 4.2.2, 4.2.4, 4.2.7 and 4.2.10 seek to safeguard soil ecosystems from adverse effects of effluent discharges to ensure sustainability of the soil ecosystem through the adoption of a precautionary approach, good practice and monitoring the effects of the discharges.
95. The proposed irrigation area within the Kepler Block was selected on the basis of a combination of attributes that reflect the suitability of the northern part of the block for wastewater disposal. In his evidence Dr Davoren refers to the areas' free draining soils, favourable depth of the unsaturated soil and sub-soil layers and the areas level terrain. The discharge of treated wastewater using centre pivot irrigators represents good practice as the irrigators allows for precise control of the depth of application based on prevailing soil and climatic conditions. Dr Davoren draws attention to the operational advantages of the centre pivot irrigators in his evidence in terms of maximising nutrient uptake by the pasture and maximising soil infiltration of the wastewater. The evidence of Mr East refers to the reduction in the concentration of contaminants or attenuation that occurs in the soils and subsoil (vadose) zone through physical and biological processes.
96. The adaptive management approach which is the cornerstone of the application includes monitoring of the soils, pasture and climatic conditions. The monitoring results will be used to regulate the application depth of discharge in order to maximise pasture production and ensure soil ecosystem function is sustained and not adversely affected.

Objective 4.1.2 and Policy 4.2.3

97. Objective 4.1.2 and policy 4.2.3 seek to safeguard surface water ecosystems from adverse effects of effluent discharges and measures to avoid, remedy or mitigate the adverse effects on water quality and water potability.
98. In his evidence Mr East describes the attenuation or reduction in wastewater contaminant concentrations that occurs within the unsaturated zone and in the groundwater zone.
99. Mr East estimates that *E.coli* concentration is likely to reduce to below 1 cfu/100 mL within 200 metres of the irrigation area.
100. Mr East estimates the expected nitrate nitrogen concentration leaching to groundwater beneath the irrigation to be approximately 10.6 mg/L which is below the NZDWS. The expected nitrate nitrogen concentration in groundwater discharging to surface water down gradient is estimated by Mr East to be between 5.3 and 9.4 mg/L depending on the degree of vertical mixing and hydraulic properties of the aquifer.
101. Ms Bennett in her evidence has determined that the nitrate nitrogen discharged to the Waiau River via the likely groundwater pathway identified by Mr East will be below the level of detection at least 200 metres downstream of the affected reach.

Objective 4.1.3 and Policy 4.2.6

102. Objective 4.1.3 and policy 4.2.6 seek to safeguard human and animal health from adverse effects of effluent discharges and measures to avoid, remedy or mitigate the adverse effects on human and animal health.
103. The application is consistent with objective 4.1.3 and policy 4.2.6 as it will result in the cessation of the discharge of treated wastewater to the Upukerora River and Lake Te Anau, thereby safeguarding human health especially with respect to contract recreation activities.
104. With respect to the Kepler Block, Mr East acknowledges that contamination of groundwater that will occur as a result of leaching of nitrogen due to the discharge of treated wastewater. A groundwater monitoring programme is advocated by Mr East which includes

sampling of groundwater from the airport well and a well situated between the irrigation area and the airport well. The purpose of the latter well is to provide an early indication of groundwater contamination immediately down gradient of the irrigation area. In the event that an increase in nitrate nitrogen is detected in this well, the SDC will initiate further monitoring through provision of additional monitoring wells as documented in the EMP. In the unlikely event that the contaminant plume was to extent as far as the airport well due to lateral dispersion, the SDC will consider provision of an alternative potable water supply for the airport terminal.

105. Should elevations in nitrogen concentrations be detected at the down gradient bores then appropriate remedial measures will be implemented by the SDC, potentially involving provision of an alternative water supply.

Objective 4.1.4 and Policy 4.2.8

106. Objective 4.1.4 and policy 4.2.8 require that amenity values are not adversely affected by effluent discharges and that measures to avoid, remedy or mitigate the adverse effects on amenity values are undertaken.
107. In my evidence I address the effects of the proposed discharge on amenity values. I concluded that centre pivot irrigators are a more common sight in the rural environment especially areas managed for intensive pastoral land usesuch as the Kepler Farm.
108. The potential for odour to affect amenity values is more a pervasive aspect of the proposed discharge which is an issue that the SDC is taking very seriously. The matter of odour management is twofold as previously discussed. The odour management measures have been addressed in Dr Davoren's evidence in terms of irrigator design and operation and in Mr Lockyer's evidence in terms of chemical treatment (dosing) of the treated wastewater.

Objective 4.1.5 and Policy 4.2.8

109. Objective 4.1.5 and policy 4.2.8 recognise and provide for the relationship of takata whenua with ancestral sites, wahi tapu and other taoka and recognise and provide for takata whenua concerns related to the discharge of effluent onto or into land.

110. Matters of cultural importance have been addressed through direct engagement with Te Ao Marama followed by public notification of the resource consent application. A review of the application by Te Ao Marama has resulted in a submission of support being provided to Environment Southland.

Regional Water Plan

Objective 1 and Policy 7

111. Objective 1 seeks to maintain the quality of water in its natural state. Natural state waters classified in the Regional Water Plan include Lakes Te Anau and Manapouri.
112. I refer to Ms Bennett's evidence concerning nitrogen loadings in Te Anau due to the existing Upukerora River discharge and to the Waiau River as a result of diffuse groundwater discharge arising from the proposed discharge to land at the Kepler Block. Based on Ms Bennett's evidence I am of the opinion that the discharge to the Waiau River via groundwater is more consistent with the intent and purpose of Objective 1.
113. Policy 7 underlines the Council's preference for disposal to land over discharges to water where this is practicable and the effects are less adverse. This application to discharge treated wastewater to land is clearly aligned with this policy.

Objective 8

114. Objective 8 seeks to maintain groundwater quality in aquifers that already meet the Drinking Water Standards for New Zealand.
115. In his evidence Mr East states that the concentration of nitrate nitrogen leaching to groundwater, based on the Overseer modelling results, is expected to be between 5.3 and 9.4 mg/l. This is below the maximum allowable value of nitrate nitrogen the NZDWS. I note that these results are based on the maximum consented wastewater flows projected in 35 years' time.

Proposed Plan Change 15 – Discharge of Contaminants onto or into Land and Historic Heritage

Objectives 9A and Policy 31C

116. Objective 9A and Policy 31C seek to maintain soil quality through management of contaminants onto or into land to avoid, remedy or mitigate adverse effects on soil quality, habitat and ecosystems, amenity and historic heritage and cultural values.
117. In regard to this objective and policy I draw attention to the evidence of Dr Davoren which includes reference to the beneficial effects of the discharge in improving the health of soils. This is the result of production of organic material which improves soil structure and assists soil moisture and nutrient retention.

Objective 9B

118. Objective 9B requires the applicant to manage discharges so that adverse effects on human health are avoided.
119. On the basis of the evidence of Dr Davoren which describes the irrigation operation and Mr East's evidence with regard to the degree of microbial attenuation that will occur in the unsaturated zone within the irrigation area I am confident that adverse effects on the health of the community will be avoided. As previously stated in my evidence the nitrate nitrogen concentrations expected to leach to groundwater as specified by Mr East is below the NZDWS. However the adaptive approach of SDC through the EMP includes an extensive groundwater monitoring programme to ensure that any elevation in nitrate nitrogen contamination are detected in up gradient bores to avoid, remedy or mitigate adverse effects on the airport well.

Objective 9C

120. Objective 9C requires the applicant to manage discharges so that the diversity and integrity of habitats and ecosystems and amenity and historic heritage values are maintained and enhanced.
121. The evidence of Mr East makes it clear that groundwater contaminated by the discharge of treated wastewater cannot affect Kepler Mire and is very unlikely to affect Home Creek. This is due to the Kepler Mire being approximately 20 metres higher than the level of

groundwater beneath the irrigation area and a groundwater flow direction assessed by Mr East as most likely to be in a northwest direction towards the Waiau River.

122. I add that no sites of heritage or cultural value occur in the vicinity of the Kepler Block.

Policy 31A

123. Policy 37A spells out regulatory authority requirements for managing environmental risk based on nine risk factors including nature and quantity of contaminants, soils with impeded drainage and proximity to surface water. Dr Davoren's evidence includes a commentary on the evaluation of a site as part of the site selection process undertaken by the SDC. The risk factors listed under Policy 37A were factored into the on-site investigations conducted by Dr Davoren and ultimately led to the selection of Kepler Block on the basis of these risk factors.

Policy 31D

124. Policy 37D promotes the discharges that maximise the potential reuse of nutrients and water contained in the discharge. The proposed discharge at the Kepler Block is aligned with this policy as the proposed discharge by centre pivot irrigators will be operated to maximise production of high quality pasture (ryegrass) for the production of baleage during the growing season.

Regional Air Quality Plan

Objective 7.2.1 and Policy 7.3.1

125. Objective 7.2.1 and Policy 7.3.1 promotes the protection of the health of people and communities from any adverse effects of odour and measures to avoid, remedy or mitigate the health impacts of offensive or objectionable odours.

Objective 7.2.2 and Policy 7.3.2

126. Objective 7.2.2 and Policy 7.3.2 promotes the protection of areas of cultural and amenity value from any adverse effects of odour and measures to avoid, remedy or mitigate the health impacts of offensive or objectionable odours on these areas.

127. The protection of the health of people and communities and cultural and amenity value from potential adverse effects of odours is dependent on a combination of measures that are addressed in the odour management plan which forms part of the EMP. As outlined earlier in my evidence these odour measures cover pivot irrigator design and operation of a trickling filter and chemical dosing of the treated wastewater prior to discharge.

OTHER PLANNING DOCUMENTS

Te Tangi a Tauria

128. Te Tangi a Tauria is the Ngāi Tahu ki Murihiku Natural Resource and Environmental Iwi Management Plan published in 2008. It contains Ngā Kaupapa (Policies) specific to wastewater disposal in the Te Rā a Takitimu or Southland Plains chapter. Policies relevant to the application are:

Policy 6

129. Policy 6 states that all discharges of wastewater must first be to land. The use of water as a receiving environment for the direct or point source discharge of contaminants is culturally unacceptable and shall be avoided.
130. The application seeking discharge of treated wastewater to the Kepler Block aligns with this policy.
131. This policy direction is reinforced in the submission from Te Ao Marama. Te Ao Marama draws attention to the statutory acknowledgement for Lake Te Anau and importance of maintenance of the lake as a natural state water body. The submission notes that removal of the discharge into the Upukerora River will greatly improve Ngāi Tahu's ability to maintain connection with the river including the mouth of the river as a traditional nohoanga. The submission adds that the effects on water bodies Ki Uta ki Tai (mountains to the sea) will be greatly reduced by the proposed scheme.

Policy 5

132. Policy 5 requires assessment of wastewater discharges in terms of matters such as location and sensitivity of the receiving environment,

actual and potential effects on cultural values, use of best practice technology and mitigation measures that minimise impacts.

133. These matters have been addressed in the evidence presented by the experts in this hearing. The Kepler Block was selected following extensive investigations of a number of potential sites. These sites were discounted due to their unsuitability as receiving environments and in particular proximity to surface water bodies. The proposal involves the use of best practice technology in the form of centre pivot irrigators and ancillary facilities dedicated to odour control. The operational flexibility of the irrigation infrastructure allows adaptive management measures to be implemented in response to monitoring data to minimise off site environmental effects.

Policies 3 and 11

134. Policy 3 requires provision of a sufficient level of information on the site to allow tangata whenua to assess cultural effects of the discharge, treatment provisions and alternatives assessed while Policy 11 requires soil risk assessments that take account of wastewater loading rates.
135. This information, including soil and groundwater investigations undertaken in the Kepler Block and other sites such as the Freestone Block is documented in the application and in the evidence provided by Dr Davoren.

Policies 15 and 16

136. Policies 15 and 16 require provision of robust monitoring programmes and environmental management plans.
137. An outline monitoring programme has been developed as part of the EMP as well as forming part of the proposed consent conditions. The purpose of the monitoring programme is to provide environmental and climatic information that will assist in optimising the operational performance of the irrigation scheme in order to minimise adverse environmental effects.

Policies 17, 18 and 19

138. Policies 17, 18 and 19 concern the duration of the consent with respect to future community growth and development, iwi preference

for a maximum term of 25 years and five yearly reviews provided in the conditions of consent to allow for consideration of technological improvements.

139. A longer term of consent of 35 years is sought in the application in order to provide security to Council in light of the significant capital investment required for a project of this nature.
140. The environmental effects assessment to the application is based on wastewater flows and nitrogen loadings projected in 35 years' time and underlies the conservative approach undertaken in the assessment. In my opinion this approach provides the decision maker with confidence that the activity is sustainable and that the mitigation measures proposed over the duration of the consent are realistic.
141. The provision of a five yearly review recognises that advances in wastewater technology are ongoing and may be adopted by the SDC where positive environmental outcomes are likely to arise.

Te Runanga o Ngāi Tahu Freshwater Policy Statement

142. This policy statement and objective and policies concern the management of the freshwater resource within the rohe of Ngāi Tahu. To Ngāi Tahu water is central to all Maori life and is a taonga left by ancestors to provide and sustain life for present and future generations of Ngāi Tahu.
143. The objectives and related policies of most relevance to this application concern restoration, maintenance and protection of the mauri of freshwater resources and maintenance of healthy mahinga kai populations and habitats. A strategy advocated in the policy statement in achieving these outcomes is:
- Councils prohibiting direct discharges of contaminants, particularly human effluent to waterways and encouragement of discharges to land.*
144. The application by SDC to discharge treated wastewater to land at the Kepler Block and to cease discharge direct to the Upukerora River aligns with this strategy and will lead to an improvement in the mauri of the river and the mahinga kai resources it provides.

DESIGNATION OF KEPLER BLOCK

145. The SDC has given notice of its requirement (NOR) for the designation of land known as the Kepler Block to be included in the Proposed District Plan in accordance with Section 168A of the RMA. The purpose of the designation is to provide for the safe and efficient operation of the wastewater irrigation infrastructure and associated facilities in the Kepler Block in the long term.
146. Section 168A of the RMA requires a territorial authority to have regard to Part 2 matters including any relevant provisions of a national policy statement, a regional policy statement or regional plan, whether adequate consideration has been given to alternative sites and whether the designation is reasonably necessary for achieving the objectives of the requiring authority which is the SDC.
147. The land that is the subject of the proposed designation is owned by the SDC. This was purchased from Landcorp in 2008 in order to secure the land for the purpose of treated wastewater disposal. Purchase of the land was justified as no other suitable sites exist in the Te Anau Basin. The designation also reduces the potential for future reserve sensitivity issues to arise.
148. The area of land required for the designation is necessary in order to permit the proposed discharge to the irrigation area on the North block of the Kepler Farm. The South block is included to accommodate increases in wastewater flows from Te Anau in the future, i.e. beyond the term of the current discharge permits being sought. The proposed designation of the Kepler Block encompasses land beyond the proposed irrigation area and includes land to the south of the airport runway and airport terminal complex.
149. Centre pivot irrigation inherently requires the appropriate area of land to enable correct application depth of irrigation, and avoidance of ponding and unnecessary discharge to groundwater.

STATUTORY ASSESSMENT

Section 105: Matters relevant to certain applications

150. Section 105(1) of the RMA states that where an application is for a discharge permit to do something that would contravene section 15 or section 15B (RMA), the consent authority must, in addition to those matters in section 104(1) have regard to:
- (a) *the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and*
 - (b) *the applicant's reasons for the proposed choice; and*
 - (c) *any possible alternative methods of discharge, including into any other receiving environment.*
151. I consider that the discharge of treated domestic wastewater onto land by centre pivot irrigators and adherence to the proposed consent conditions, including the EMP is appropriate and takes account of the sensitivity of the receiving environment at the Kepler Block based on assessment of alternative sites by the SDC.

Section 107: Restriction on Grant of Certain Discharge Permits

152. Section 107(1) of the RMA states that a consent authority shall not grant a discharge permit to do something that would otherwise contravene section 15 or section 15A through allowing the discharge of a contaminant onto land in circumstances which may result in that contaminant entering water if, after reasonable mixing, the contaminant discharged is likely to give rise to all of the following effects in receiving waters:
- (c) *the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;*
 - (d) *any conspicuous change in the colour or visual clarity;*
 - (e) *any emission of an objectionable odour;*
 - (f) *the rendering of freshwater unsuitable for consumption by farm animals;*
 - (g) *any significant adverse effects on aquatic life.*
153. On the basis of expected minor to negligible effects of the groundwater discharge on the water quality of the Waiau River as described in Ms Bennett's evidence and in consideration of the degree of attenuation that will occur within the unsaturated layer and within the groundwater as described by Mr East I believe the discharge

activity as proposed will not give rise to any of the effects listed under Section 107(1) of the Act.

Part 2 of the Resource Management Act 1991

Section 6: Matters of National Importance

154. I consider that Sections 6(c) and (e) are of relevance to this application.
155. The site selected for the discharge of treated wastewater which forms the basis of the application lies in proximity to the Kepler Mire and Home Creek, areas of significant indigenous vegetation and significant habitats for indigenous fauna. The groundwater assessment undertaken in support of the application shows that the proposed discharge will not affect the Kepler Mire or Home Creek. The assessment has established that groundwater most likely flows in a northwest direction away from these waterbodies. The assessment also shows that the depth of the groundwater relative to the Kepler Mire is approximately 20 metres and precludes any possibility of contamination of the Kepler Mire.
156. SDC is upholding Section 6(e) by committing to ceasing the discharge of treated wastewater to the Upukerora River and Lake Te Anau. The Crown, including the Council recognises the relationship that Kāi Tahu has with the lake and the rivers that flow into the lake and the culture and traditions of these waterbodies. This relationship has been formally acknowledged by the Crown through a statutory acknowledgement ascribed to the lake under the Ngāi Tahu Claims Settlement Act 1998.

Section 7: Other Matters

157. I consider that 7(a), (aa), (b), (d), (g) and (h) are of relevance to this application.
158. Regard to Kaitiakitanga (section 7(a)) and the ethic of stewardship (section 7(aa)) is linked to the purpose of the application to discharge treated wastewater to land recognises that cultural resources are affected by the current discharge to the Upukerora River.
159. The proposed discharge in my opinion represents efficient use of and development of natural and physical resources in terms of Section

7(b). The application involves the discharge of wastewater by spray irrigation to land which will enhance pasture production for stock feed. The proposed site for irrigation has been assessed through a site selection process as possessing suitable soils for attenuation of most of the contaminants in the wastewater stream.

160. Having regard to the intrinsic value of ecosystems in terms of Section 7(d) is reflected in the decision of SDC to discontinue the discharge of treated wastewater to the Upukerora River in favour of discharge to land at the Kepler Block.
161. In terms of Section 7(g) I consider the finite characteristics of natural resources relate to the soil ecosystems of the proposed irrigation area. Maintenance of soil ecosystem functions is a crucial aspect of the application to ensure contaminant attenuation capacity is maintained. The consent conditions proposed with this application and the EMP provide for regular monitoring of soil chemistry and moisture, and pasture condition within the irrigated area in order to gauge effects on soil ecosystem health and remedial responses required, if any.
162. In terms of Section 7(h) protection of habitat of trout in the Upukerora River is enhanced through the cessation of discharge of treated wastewater to the river.

Section 8: Treaty of Waitangi

163. Section 8 of the Act requires all persons exercising functions and powers under it, in relation to managing the use, development and protection of natural and physical resources to take into account the principles of the Treaty of Waitangi.
164. The approach of the SDC to this application and in particular the ceasing of the discharge of treated wastewater to the Upukerora River achieves two of the Principles of the Treaty of Waitangi; The Principle of Partnership and Good Faith and The Principle of Active Protection.
165. Ceasing the discharge of treated wastewater to the Upukerora River as part of this application recognises the importance of the statutory acknowledgement for Lake Te Anau to Ngāi Tahu. Ceasing the discharge will greatly improve Ngāi Tahu's ability to maintain connection with the river including the mouth of the river as a

traditional nohoanga as well as protecting the mauri of the river and the mahinga kai resources it provides.

Section 5: Purpose

166. The application which seeks to discharge treated wastewater to land aligns with Section 5(2)(a). The application seeks a 35 year term so as to take account for the needs of future generations through analysis of projected wastewater flows over this time frame using various growth scenarios. The application addresses cultural issues with the current discharge to the Upukerora River, and has involved an extensive site selection process and investigations that provide surety to the decision maker that the best site has been selected for wastewater disposal and treatment. I note the policy direction of central government towards land based treatment of wastewater in the NPS for Freshwater Management and in the Regional Policy Statements and Regional Water Plan.
167. In terms of Section 5(2)(b) I consider the life supporting capacity of the aquatic ecosystems of the Upukerora River and Lake Te Anau will be safeguarded through termination of discharge of treated wastewater.
- The effects on the aquatic ecosystems of the Waiau River due to the discharge of treated wastewater to land at the Kepler Block have been assessed as less than minor. This assessment is based on extensive groundwater investigations, including contaminant attenuation modelling and mass balance calculations.
168. In my opinion the application is consistent with Section 5(2)(c). The proposed consent conditions and the EMP as drafted are comprehensive and I am confident adherence to these conditions and the EMP will ensure the adverse effects of the proposed discharge will be avoided, remedied or mitigated.
169. Overall in my assessment I conclude that the proposal does represent sustainable management and can appropriately be approved.

STAFF REPORT

170. I have read the staff report and concur with the assessment of environmental effects and the analysis of Part 2 of the Resource Management Act 1991 and the relevant statutory documents.
171. I have provided a marked up version of the suggested conditions which forms Appendix 1 to my evidence. The mark ups concern changes sought by the SDC to some of the conditions. I support these changes and consider the conditions are comprehensive, and integrate well with the EMP. I discuss the rationale for the changes sought below.

Discharge Permits 302625 and 302625A

172. Suggested condition 1(a) to both permits specifies a period of 25 years. The staff report raises the element of uncertainty associated with technology in the application in justifying a recommended term of 25 years. The proposal involves considerable capital investment required to construct and operate the scheme. This is coupled with the adaptive approach in the EMP and OMP in terms of managing the environmental effects. This approach is founded on regular monitoring and reporting requirements which is further consolidated by the review clause included in the suggested conditions. It should be noted that the modelling results that form the basis of the groundwater and surface water assessments in the application are based on projected treated wastewater flows in 35 years' time which represent a worst case scenario. I also note there is the potential to use this site for disposal of treated wastewater from Manapouri in 10 years' time when that consent expires. Overall I consider technology improvements can be managed by the broad review conditions. Reducing the consent term is not in my view necessary to achieve this. I am satisfied for a consent such as this a 35 year term is appropriate.
173. A change to condition 1(b) of both permits concerning the lapse period is sought so the lapse period is not eroded in the event of an appeal.
174. A change to conditions 13(a)(ii) and 9(b) of the permits is sought to provide for the inclusion of a soil specialist on the TWG. An additional change to the condition is sought to separate the regulatory role of Environment Southland from the operational role of TWG. Mr Evans provides further justification for this change in his evidence.

Discharge Permit 302625

175. The area of the consented irrigation area as specified in Condition 2 is incorrect. The irrigation area is 125 hectares in extent not 75 hectares. The latter area relates solely to the area subject to centre pivot irrigation. The area beyond the centre pivot irrigators will be used to site the trickling filter and soil bio-filer and expansion of the shelterbelts with the balance of the area possibly used in the future for treated wastewater irrigation.
176. Condition 3 refers to exclusion of treated wastewater from any other wastewater treatment system. This would preclude the opportunity for treated wastewater from Manapouri township being conveyed to the Kepler Block in the future. This matter is addressed in Mr Evan's evidence.
177. The depth of irrigation specified in condition 5(b) reflects the average rate of flow of treated wastewater in summer and winter. The marked up depths correlate with the maximum rate of flow projected in summer and winter in 35 years' time.
178. Condition 7 should be deleted because the imposition of a minimum control on dry matter production may impose an unrealistic constraint on the SDC and lead to potential adverse environmental effects if there is a poor growing season. This could require SDC to cut grass when the sward is too short. Mr Davoren discusses this matter further in his evidence.
179. Condition 8 requires clarification as to the actual irrigation area that is the subject of this application. Reference to the consent holder's property applies to the entire Kepler Block which is on the north and south sides of the airport runway and possibly the airport too. Reference to spray drift is also deleted as the potential for spray drift to impinge on the buffer zone is possible, but the focus should be on setting back the actual irrigation.
180. Condition 10 requires an amendment to reflect the provision of three tier shelterbelts proposed along the western and eastern boundaries in addition to the northern boundary as described in the application.
181. An amendment is sought to Condition 13(a)(iii) to ensure consistency with Condition 9(c) of Discharge Permit 302625A.

182. A change to condition 14(a) is sought to include reference (and thus linkage) to exceedance of trigger levels as specified in Condition 20. This is a key facet of the monitoring programme.
183. Condition 16 is considered too specific and needs to refer to the detailed groundwater monitoring programme as specified on Condition 14. This programme will include existing wells D43/0033, D43/0067 and wells 1, 2 3, and 4.
184. The change sought to Condition 20 serves a similar purpose as the change sought to Condition 16 in terms of providing linkage to condition 14, i.e. the groundwater monitoring programme. Reference to faecal coliforms requires removal in favour of *E.coli* to be consistent with the parameters to be monitored as specified in Conditions 16(ii), 17(ii) and 18(ii).
185. The changes sought to Conditions 21 and 22 including the composite sampling and suite of parameters to be analysed is recommended by Mr Davoren.

Discharge Permit 302625A

186. The detail requested in suggested condition 4 with respect to the type of floating mechanical aerator and the oxidant dosing system is considered unnecessary. The key factor is the performance of the aerators and the dosing system which will be reflected in the monitoring results. Mr Evans discusses this matter further in his evidence.
187. Condition 8(a) requires design of the trickling filter and associated plant to be "approved by Council's compliance manager". This approval is essentially approving the technical design, without any stated criteria. I do not consider this approval type condition is suited to approval of specialist equipment such as this. I recommend the approval requirement is deleted.

CONCLUSIONS

188. The project will result in significant positive effects from a contact recreation and cultural perspective through cessation of the discharge of treated wastewater to the Upukerora River and Lake Te Anau.
189. The selection of the proposed irrigation area is based on extensive investigations of potential sites in the Te Anau Basin and within the Kepler Block.
190. The project involves the use of the best available irrigation and odour management technology.
191. The adaptive management approach promoted in the EMP and OMP that form part of the application in combination with comprehensive monitoring and reporting requirements including groundwater quality trigger levels will ensure that the effects of the discharge of treated wastewater beyond the irrigation area will be no more than minor.
192. The project is consistent with Part 2 of the Resource Management Act 1991.

DATED this 27th day of June 2014

Simon Beale

REFERENCES

- Civil Aviation Authority, 2003. Bird Hazards. GAP publication.
- Civil Aviation Authority, 2008. Guidance material for land use at or near aerodromes.
- Civil Aviation Authority, 2011. Advisory Circular AC139-16. Wildlife Hazard Management at Aerodromes.
- Department of Conservation. 2003. A Directory of Wetlands in New Zealand.
- Environment Southland 1997. Operative Regional Policy Statement for Southland.
- Environment Southland 2012. Proposed Regional Policy Statement for Southland.
- Environment Southland 2010. Regional Water Plan for Southland.
- Environment Southland 1999. Regional Air Plan for Southland.
- Environment Southland 1998. Regional Effluent Land Application Plan.
- Heather, B. and Robertson, H. 1996. The Field Guide to the Birds of New Zealand. Penguin Books (NZ) Ltd, Auckland. Revised Edition, 2005.
- Ministry for the Environment, 2008. National Environmental Standard for Source of Human Drinking Water.
- Ministry for the Environment, 2011. National Policy Statement for Freshwater Management 2011.
- Miskelly et al, 2008. Conservation status of New Zealand Birds, 2008.
- Notornis, 2008. Vol. 55: 117-135
- Ngai Tahu ki Murihiku, 2008. Te Tangi a Tauria. Natural Resource and Environmental Iwi Management Plan 2008.
- Robertson, C.J.R; Hyvonen, P; Fraser, M.J; Pickard, C.R. 2007. Atlas of Bird Distribution in New Zealand. 1999-2004. The Ornithological Society of New Zealand, Inc., Wellington.
- Southland District Council, 2001. Southland District Plan.
- Southland District Council, 2012. Proposed Southland District Plan.
- Te Runanga o Ngai Tahu, 1999. Freshwater Policy.

APPENDIX 1 – SUGGESTED CONDITIONS

Suggested Conditions

Discharge Permit No 302625

Consent Period and Lapse

1. This resource consent:

- (a) shall expire on ** August ~~2039~~2049; but
- (b) shall lapse if not given effect by ~~** August 2019~~ to within five years of it commencing.

(Note: Pursuant to Sections 123 and 124 of the Resource Management Act 1991, a new consent will be required at the expiration of this consent. The application will be considered in accordance with the plans in effect at that time, and the adverse effects of the proposed activity.)

Purpose

2. This consent authorises the discharge of treated wastewater onto land from the Te Anau wastewater treatment plant, via a spray irrigation system, as described in the application to the north of the airport runway, onto land known as the Kepler Block and legally described as Lot 2 DP 410687 at or about map reference NZTM 2000 co-ordinates E1182670 N4944369 ("irrigation area").

The consented irrigation area is identified as 75 125 hectares north of the airport runway as shown on Attachment 1.

3. This consent does not authorise the disposal of sludges or untreated sewage ~~or treated wastewater from any other wastewater treatment system.~~

Accidental or Emergency Discharges

4. In the event of an emergency or accidental discharge of sewage or partially treated wastewater onto land, including outside of the irrigation area, or over application of chemical treatments, the consent holder (or the consent holder's agent) shall without undue delay, notify:

- the Medical Officer, or Health Protection Officer (ph (03) 211 0900);
- Te Ao Marama Inc (ph (03) 929 6032); and
- Council's Pollution Response Hotline (ph 0800 76 88 45).

Irrigation/Effluent Limits and Nutrient Loading

5. The land disposal operation is restricted to the following parameters:

- (a) the discharge onto land shall not exceed a maximum application rate of 4,500 m³ per day between 1 September and 30 April and 2,000 m³ per day between 1 May and 31 August;

- (b) the depth of application shall not exceed:
- (i) ~~4.56.5~~ mm across the irrigation area over any 24 hour period between 1 September and 30 April;
 - (ii) ~~2-2.9~~ mm across the irrigation area over any 24 hour period between 1 May and 31 August, when rate of flow of treated wastewater is 2,000 m³ per day;
- (c) the annual nitrogen loading rate onto land within the ~~irrigation~~ area for wastewater shall not exceed 290 kg/N/ha/yr;
- (d) the ~~monthly combined~~ nitrogen loading rate (for fertilisers ~~and wastewater~~) ~~for application within~~ applied to the irrigation area during the summer months shall not exceed 100 kg/N/ha/month;
- (e) the annual phosphorous loading rate shall not exceed 100 kg/ha/year; and
- (f) the application of wastewater onto land ~~within the irrigation area~~ shall be so arranged that the total annual loading is spread as evenly as practicable over the ~~entire~~ irrigation area.
6. (a) There shall be no surface run-off, prolonged ponding, or contamination of surface water, resulting from the application of treated wastewater onto the land. For the purpose of this consent, prolonged ponding is deemed to occur if wastewater remains on an area for more than three consecutive hours.
- (b) In the event of prolonged ponding the consent holder shall cease irrigation of the area of ponding until the ponding has dissipated.
7. ~~The consent holder shall exercise a “cut and carry” operation for pasture management within the irrigation area, as described in the application, which shall recover and export off site a minimum of 13,500 kg of dry matter per annum.~~

Buffer for Discharge and Shelter Belt Retention and Planting

8. No irrigation of treated wastewater onto land ~~or spray drift~~ shall occur within 30 metres of the ~~southern~~ boundary ~~of between~~ the Northern Block and the Airport (as shown on figure 3.2 of the application). ~~consent holder’s property.~~
9. The consent holder shall retain the existing radiata pine and Eucalyptus shelter belts along the eastern and western boundaries of the consent holder’s property during the period of this consent.
10. Prior to irrigation of treated wastewater authorised by this consent commencing, the consent holder shall plant and maintain a shelter belt along the consent holder’s northern, western and eastern boundary which shall comprise three staggered rows of radiata pine.

System Requirements

11. The consent holder shall erect and maintain:
 - (a) fencing around the irrigation area to restrict access to the irrigation area; and
 - (b) signage at the irrigation area warning the public that the area is used for the irrigation of treated wastewater.
12. The consent holder shall maintain a log of inspections, maintenance and works carried out on the trickling filter, bio-filter and irrigators and make the log available, upon request, to the Council's Compliance Manager.
13. The consent holder shall:
 - (a) prepare an Environmental Management Plan (EMP) for the Kepler Block Irrigation System. Prior to irrigation of treated wastewater authorised by this consent commencing, the consent holder shall forward a copy of the EMP to Council's Compliance Manager. The EMP shall include:
 - (i) the appointment of a suitably qualified person responsible for the day-to-day operation of the irrigation system, including the trickling filter and bio-filter and as a point of contact for Environment Southland in respect of complaints;
 - (ii) the arrangements for the establishment, membership and functions of a Technical Working Group which shall comprise, as a minimum, Southland District Council's Strategic Manager – Water and Waste, the farm manager, an odour specialist, a groundwater specialist and a soil specialist. and a representative of Environment Southland; The Working group will meet with Environment Southland staff twice in the first year of operation and annually thereafter to present information relating to the operation of the Te Anau scheme.
 - (iii) how the trickling filter, bio-filter, chemical dosing and irrigation system are to be operated to ensure that the discharge is optimised at all times;
 - (iv) the adaptive management responses to be adopted in response to groundwater and soil monitoring results;
 - (v) an Odour Management Plan;
 - (vi) contingency measures to handle emergency events;
 - (b) review the EMP at least annually, and or undertake a review when there are significant changes to the Te Anau WWTP and Kepler Block irrigation system or their operation; and
 - (c) operate and maintain the Te Anau WWTP and Kepler Block Irrigation System in accordance with the EMP.

Monitoring

14. The consent holder shall develop a detailed groundwater monitoring programme (GMP), including those required by Condition 15,16 and 17 prior to commissioning

of the irrigation scheme. The consent holder shall forward a copy of the GMP to Council's Compliance Manager. As a minimum, the GMP shall:

- (a) identify whether there is a need for the installation of additional monitoring wells to adequately determine the effects of the irrigation on groundwater quality and to ensure that any decrease in down gradient groundwater quality [exceeding trigger levels in condition 20](#) is identified before it has the potential to impact on groundwater users, particularly drinking water supplies, in the surrounding area;
- (b) determine the location of the new wells if required, based on review of data from the existing monitoring wells to allow confirmation of groundwater flow directions;
- (c) determine the design (depth and internal diameter) of new wells to ensure they are fit for purpose;
- (d) determine the frequency of sampling;
- (e) determine the contaminants to be analysed; and
- (f) include wells designed for the following purposes:
 - (i) at least one monitoring well sited up gradient of the irrigation area to determine background groundwater quality, unaffected by the waste water irrigation;
 - (ii) at least two monitoring wells to determine groundwater quality down gradient of the waste water irrigation area;
 - (iii) an additional monitoring well between the airport water supply well and the irrigation area to act as a sentinel well for protection of the airport water supply; and
 - (iv) sufficient wells to determine groundwater flow direction in the vicinity of the irrigation area and to determine whether groundwater flow is being directed towards Frasers Beach.

The TWG will be responsible for assessing the monitoring results and determining any changes to the management of the irrigation system in light of the results.

15. If the monitoring of wells down gradient of the irrigation area exceed the trigger values specified in condition 20, the consent holder shall undertake one or more of the following:
 - (i) check for anomalous results;
 - (ii) assess monitoring results from the up gradient well to determine whether the exceedance of the trigger value is the result of other land uses;
 - (iii) identify any mitigation measures that are considered necessary to ensure that groundwater quality is consistent with the predictions of the application document; and

- (iv) submit a report of the actions undertaken to Environment Southland's Compliance Manager which identifies any mitigation measures that have been identified and a programme for implementing these measures.
16. The consent holder shall undertake sampling of groundwater ~~from existing wells D43/0033 and D43/0067 and from proposed wells number 1, 2, 3 and 4 shown on Attachment A~~ from the wells identified in the GMP required by condition 14 for the purposes of establishing “baseline” groundwater quality as follows:
- (i) samples shall be taken on a three monthly basis for at least one year prior to the irrigation of treated wastewater authorised by this consent first commencing.
- (ii) each sample shall be analysed for:
- pH;
 - Electrical conductivity;
 - Carbonaceous biochemical oxygen demand (CBOD₅);
 - Total ammoniacal nitrogen concentration;
 - Total nitrogen concentration;
 - Nitrate nitrogen concentration;
 - Total phosphorus concentration;
 - Dissolved reactive phosphorus and
 - E-coli.
17. The consent holder shall monitor:
- (a) the daily rate of treated wastewater discharged onto land at the Kepler Block;
- (b) the quality of treated wastewater by taking a representative sample of the discharge from the feed main immediately prior to the irrigators at the Kepler Block as follows:
- (i) samples shall be taken on a three monthly basis for the first three years and twice per year thereafter;
- (ii) each sample shall be analysed for:
- pH;
 - Electrical conductivity;
 - Carbonaceous biochemical oxygen demand (CBOD₅);
 - Total ammoniacal nitrogen concentration;
 - Total nitrogen concentration;
 - Nitrate nitrogen concentration;
 - Total phosphorus concentration
 - Dissolved reactive phosphorus; and
 - E-coli.

18. The consent holder shall undertake sampling of groundwater from the wells identified in the GMP for the purposes of monitoring the effects of the discharge of treated wastewater onto land at the Kepler Block on groundwater quality as follows:
- (i) samples shall be taken on a three monthly basis for at least three years from the commencement of the irrigation of treated wastewater authorised by this consent and twice per year thereafter;
 - (ii) each sample shall be analysed for:
 - pH;
 - Electrical conductivity;
 - Carbonaceous biochemical oxygen demand (CBOD₅);
 - Total ammoniacal nitrogen concentration;
 - Total nitrogen concentration;
 - Nitrate nitrogen concentration;
 - Total phosphorus concentration;
 - Dissolved reactive phosphorus; and
 - E-coli.
19. (a) Sample collection, preservation and analysis, as required by conditions 16, 17 and 18, shall be carried out in accordance with the most recent edition of APHA “Standard Methods for the Examination of Water and Wastewater”.
- (b) The monitoring and analyses are to be carried out by a laboratory with IANZ registration or equivalent.
- (c) The sample results and results of analysis, carried out in accordance with conditions 16, 17 and 18, shall be supplied to the Council’s Compliance Manager no later than 20 working days from receipt of the sample results by the consent holder. The methods of the analysis are to be specified with the results.
20. (a) The wastewater discharge shall not cause the groundwater quality down-gradient and outside of the irrigation area [measured in wells identified for this purpose in the GMP in condition 14](#) to exceed the following standards:
- (i) the nitrate nitrogen concentration shall be below 11.3 mg/l; and
 - (ii) ~~faecal coliforms~~ [E-coli](#) shall be below 10 cfu/100 ml.
- (b) The trigger levels which will result in the actions required by condition 15 are:
- (i) the nitrate nitrogen concentration exceeding 5.5 mg/l; and
 - (ii) ~~faecal coliforms~~ [E-coli](#) exceeding 10 cfu/100 ml in any individual sample or >1 cfu/100ml in consecutive samples.
21. For the purposes of establishing “baseline” soil quality within the proposed irrigation area, the consent holder shall, in the month of June preceding the commencement of irrigation of treated wastewater:

(a) carry out sampling within the proposed irrigation area. The sample shall be a composite of samples from a soil depth of 0–7.5 cm from 10 locations in the irrigation area. The soil samples ~~are to~~shall be analysed for:

- pH;
- phosphorous;
- ~~phosphorous retention index;~~
- potassium;
- calcium;
- magnesium;
- chloride;
- ~~arsenic;~~
- ~~cadmium;~~
- ~~copper;~~
- ~~chromium;~~
- ~~lead;~~
- ~~nickel;~~
- ~~zinc;~~
- sodium;
- sulphur or sulphate sulphur;
- total organic carbon;
- total nitrogen;
- nitrate N;
- base saturation %;
- cation exchange capacity (CEC);
- ~~bulk density.~~

~~(b) assess earthworm populations annually at each site; and~~

(c) supply the sample results to the Council’s Compliance Manager no later than 20 working days from receipt of the sample results by the consent holder.

22. For the purpose of monitoring the effects of the irrigation of treated wastewater on soils, the consent holder shall:

(a) carry out sampling in June each year. The soil samples are to be analysed for:

- pH;
- phosphorous;
- ~~phosphorous retention index;~~
- potassium;
- calcium;
- magnesium;
- chloride;
- ~~arsenic;~~
- ~~cadmium;~~
- ~~copper;~~
- ~~chromium;~~
- ~~lead;~~

- ~~nickel;~~
- ~~zinc;~~
- ~~sodium;~~
- ~~sulphur or sulphate sulphur;~~
- ~~total organic carbon;~~
- ~~total nitrogen;~~
- ~~nitrate N;~~
- ~~base saturation %;~~
- ~~cation exchange capacity (CEC);~~
- ~~bulk density;~~
- ~~total nitrogen;~~

- (b) ensure that at least one sample is from a nearby non-irrigated area for the purposes of control;
- (c) collect soil samples from the control and irrigation areas; ~~composited from 10 locations within the irrigation areas, at the composites being samples from a soil depth of 0–7.5 cm from 10 locations throughout the control and irrigation areas~~;
- (d) ~~assess earthworm populations annually at each site; and~~
- (e) supply the sample results to the Council’s Compliance Manager no later than 20 working days from receipt of the sample results by the consent holder.

Complaints

23. The consent holder shall maintain a register of complaints received about the wastewater disposal system. The register shall record the response and actions taken to each complaint. A copy of the complaints register shall be forwarded to Council’s Compliance Manager annually, within three months of the anniversary of the granting of this consent or on request.

Environmental Effects Review and Reporting

24. Three years after commencement of operation of the irrigation system and thereafter every five years, the consent holder shall undertake a review of the Te Anau WWTP system and Kepler Block Irrigation System. Each review shall assess, but not be limited to the following:

- the operation and performance of the treatment and irrigation systems;
- the results of all monitoring undertaken in association with this resource consent;
- any other relevant data that is available and of relevance to the discharge;
- ~~where whether~~ there is any significant adverse effect on the environment that can be “avoided, remedied or mitigated” by changes to the treatment and/or irrigation system;
- the nature of any improvements, if considered necessary; and
- impacts of any changes on the resource consent conditions.

25. In association with condition 24, the consent holder shall prepare an “Environmental Effects Review” report that is to be submitted to the Council’s Compliance Manager within three months of each review being completed. The report shall outline all relevant outcomes of the review process.

Annual Charges

26. 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.

Review

27. The Southland Regional Council may serve notice of its intention to review the conditions of this consent, in accordance with the conditions of this resource consent and Sections 128 and 129 of the Resource Management Act 1991, during the period March to September each year, for the purposes of:
- (a) requiring annual monitoring of the discharge or its effects
 - (b) dealing with any adverse or cumulative effects on the environment which may arise from the exercise of this consent; or
 - (c) complying with the requirements of a regional plan.



Discharge Permit to Air No 302625A

Consent Period

1. This resource consent:
 - (a) shall expire on ** August ~~2039~~2049; but
 - (b) shall lapse if not given effect by ~~** August 2019~~to within five years of it commencing.

Purpose

2. This consent authorises the discharge of contaminants to air, namely odour and spray drift, arising from treated wastewater irrigation ~~via two centre pivot irrigators~~ as described in the application onto land known as the Kepler Block at about map reference NZTM 2000 co-ordinates E1182670 N4944369 ("irrigation area").

Odour

3. There shall be no discharge of odour beyond the boundaries of the consent holder's property that is noxious, offensive or objectionable to such an extent that it has an adverse effect on the environment beyond the boundaries of the consent holder's property. When odour is being assessed for the purposes of this condition the following factors are to be taken into consideration:
 - frequency of the odour;
 - intensity of the odour;
 - duration of the odour;
 - offensiveness of the odour; and
 - location of the odour effect.

Actions

4. Before irrigation of treated wastewater authorised by this consent commences the consent hold shall:
 - (a) install a finer screen, at the Te Anau Wastewater Treatment Plant, as described in the application;
 - (b) install ~~a minimum of six Tornado~~ floating mechanical aerators in Pond 1 at the Te Anau Wastewater Treatment Plant; and
 - (c) ~~submit full details of the oxidant dosing system to Council's Compliance Manager~~.
5. The consent holder shall:
 - (a) carry out the following actions:
 - (i) a monthly inspection and review of the trickling filter, bio-filter and centre pivot irrigators' operation identifying any potential adverse events; and

- (ii) a monthly “walk around” by suitably experienced personnel, noting the conditions of the trickling filter, bio-filter, centre pivot irrigators, irrigation area and property boundary identifying any potential adverse odour or spray drift effects;
- (b) record the above information in an Odour Monitoring Diary.
6. The consent holder shall maintain an odour complaints diary. The diary shall record, as a minimum:
- the date and time of each complaint;
 - weather conditions at the time of the complaint (wind direction, wind speed and ambient temperature);
 - nature of the complaint;
 - location of the complaint;
 - nature and intensity of the odour;
 - operating conditions at the time of the complaint, including any malfunctioning or breakdown of control equipment; and
 - corrective action taken (or not taken) by the consent holder to minimise the risk and extent of the recurrence of the causes of the complaint.
7. The consent holder shall prepare an Annual Operation Review. This shall include the maintenance activities undertaken of the odour mitigation plant during the previous 12 months, including:
- monitoring and maintenance of the trickling filter;
 - monitoring and maintenance of the bio-filters; and
 - any spare parts purchased.
8. (a) Before irrigation of treated wastewater authorised by this consent commences the consent holder shall prepare a final design for the trickling filter, [oxidant dosing system](#) and bio-filter which shall be submitted to ~~and approved by~~ Council’s Compliance Manager.
- (b) The trickling filter, ~~and bio-filter~~ [and oxidant dosing system](#) shall be installed before irrigation of treated wastewater authorised by this consent commences.
9. The consent holder shall prepare an Odour Management Plan (OMP) for the Kepler Block Irrigation System, to be incorporated into an Environmental Management Plan. Prior to irrigation of treated wastewater authorised by this consent commences, the consent holder shall forward a copy of the OMP to Council’s Compliance Manager. The OMP shall include:
- (a) the appointment of a suitably qualified person responsible for the day-to-day operation of the irrigation system, including the trickling filter, bio-filter and oxidant dosing system;
 - (b) the arrangements for the establishment, membership and functions of a Technical Working Group which shall comprise, as a minimum, Southland District Council’s Strategic Manager – Water and Waste, the farm manager,

an odour specialist, a groundwater specialist and a soil specialist. The Working group will meet with Environment Southland staff twice in the first year of operation and annually thereafter to present information relating to the operation of the Te Anau scheme.; and a representative of Environment Southland;

- (c) how the trickling filter, bio-filter, oxidant dosing system and irrigation system is to be operated to ensure that the discharge and avoidance and mitigation of odour is optimised at all times;
 - (d) the adaptive management responses to be adopted in response to odour monitoring and odour complaints;
 - (e) as a minimum, review the OMP annually, and undertake a review when there are significant changes to the Te Anau WWTP and Kepler Block irrigation system or their operation; and
 - (f) operate and maintain the Te Anau WWTP and Kepler Block Irrigation System in accordance with the OMP.
10. Three years after commencement of operation of the irrigation system and thereafter every five years, the consent holder shall undertake a review of the Te Anau WWTP system and Kepler Block Irrigation System. Each review shall assess, but not be limited to the following:
- the operation and performance of the treatment and irrigation systems;
 - the results of all monitoring undertaken in association with this resource consent;
 - any other relevant data that is available and of relevance to the discharge
 - where-whether there is any significant adverse effect on the environment that can be “avoided, remedied or mitigated” by changes to the treatment and/or irrigation system;
 - the nature of any improvements, if considered necessary; and
 - impacts of any changes on the resource consent conditions.
11. In association with Condition 101, the consent holder shall prepare an “Environmental Effects Review” report that is to be submitted to the Council’s Compliance Manager within three months of each review being completed. The report shall outline all relevant outcomes of the review process.

Reporting

12. By the last working day of July each year, the consent holder is to provide Council’s Compliance Manager with an Annual Odour Monitoring Report, which shall include:
- (i) the Odour Monitoring Diary specified in condition 5;
 - (ii) the Odour Complaints Diary Specified in condition 6; and
 - (iii) the Annual Operation Review specified in condition 7.

Annual Charges

13. 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.

Review

14. The Southland Regional Council may serve notice of its intention to review the conditions of this consent, in accordance with the conditions of this resource consent and Sections 128 and 129 of the Resource Management Act 1991, during the period March to September each year, for the purposes of:
 - (a) requiring or amending monitoring of the discharge and/or its effects on the environment;
 - (b) dealing with any adverse or cumulative effects on the environment which may arise from the exercise of this consent; or
 - (c) complying with the requirements of a regional plan.