23 October 2019

Kelly Walker
Environment Canterbury
Timaru Office

OCEANIA DAIRY LTD – RE REQUEST FOR FURTHER INFORMATION

Dear Kelly

Thank you for your letter dated 14 October 2019, setting out the information you require to complete your assessment. A response to each query is provided below.

1. Further information on dispersion modelling

a. *The dispersion assessment has assumed a constant discharge of 10,000m^3/day. However, in the AEE it states that the discharge will be to a land based-based header tank first and will only discharge to the outfall when there is adequate head. This process is typical for gravity-based outfalls and hence the flows could be intermittent and be potentially higher than the average flow used in the assessment. Please quantify the range of flows to inform the dispersion assessment.*

Response

A discharge of 10,000m^3/day is the maximum proposed discharge rate (i.e., proposed limit), being up to 4,000 m^3/d from the most offshore diffuser and 3,000 m^3/d from the other two branching ones. Notwithstanding the fact that the outfall system is being designed (and the consent being sought) for discharging the maximum probable daily flow, the intent is to (partially) discharge to land in the first instance when conditions are favourable. The wastewater system is designed such that the discharge will be to a land-based header tank first to allow this. In the summer months, we expect the discharge to the ocean to be less than 10,000 m^3/day.

In the specimen design, we have sized the wastewater system to have a 1.4 to 1.8 m/sec (or 125 to 170 m^3/h based on the proposed pipe sizes at the diffusers) and pressure drop of 4.0m over the entire length of the outfall pipe. Installing a control valve in conjunction with the header tank will allow maintenance of flows as above when the driving head in the tank is higher than 4.0m. Notwithstanding the above, a pump station will be constructed, in conjunction with the header tank to discharge at a uniform flow rate to the outfall as per the flows modelled to assess dispersion in the ocean.

Babbage Consultants Limited
Level 4, 68 Beach Road, Auckland 1010
PO Box 2027, Shortland Street,
Auckland 1140, New Zealand
T 09 379 9980 F 09 377 1170
E admin@babbage.co.nz www.babbage.co.nz

b. *Currently there appears to be no concept design of the outfall and diffusers. Hence, it is difficult to quantify near field effects as they are directly related to the configuration of the outfall and diffusers. Please quantify the discharge flows at each of the diffusers.*

Response

Currently there is only a specimen design and details are provided in the Specimen Design Report. In our specimen design we have three diffusers branching out from the main pipeline. Each of these branches will have a riser with a duckbill valve fitted at the end of it. The proposed pipe sizes allow for a discharge of up to 4,000 m^3/d from the most offshore diffuser and 3,000 m^3/d from the other two.

All the modelling done for expected dilutions used 8 x8 m cell grids and considered that the discharge is into the top ~1 m thick layer of the 3D model, (i.e. initial dilution occurs in 64 m^3). This is considered conservative, since as well as no diffusers are being applied, there is no mixing/dilution of the buoyant plume between the seabed discharge and the 1 m deep surface layer (~6-8 m of water column).

c. *The modelling methodology only simulates far field effects and hence near field dilutions are expected to be over predicted. Please provide further information on the nearfield mixing and define the mixing zone, noting it will be a function of the diffuser configuration and sizing. It is noted that commonly nearfield mixing is assessed via software such as PLUMES or CORMIX.*

Response

As above, the nearfield dilution presented in the Dispersion Modelling Report (eCoast, 2019) is considered conservative due to discharging into the top layer, 1 m deep, 8 x 8 m surface cell of the 3D model. PLUMES, CORMIX or VIZJET are empirical models that can be used to determine the nearfield mixing which can then be applied as a boundary to a numerical dispersion model.

Furthermore, the ecological assessments and field surveys showed that there is low diversity and low abundance of invertebrates and fish in the immediate vicinity, as in the wider area, making a detailed assessment of near-field (i.e. beyond the 8x8 cells) unnecessary. We consider that for the area, in the absence of diffusers (which is where a mixing zone model is normally applied), the modelling of simple discharge into the surface layer is considered conservative and will likely result in under-predicted dilution in the nearfield.

d. *The sensitivity assessment completed for the outfall layout is likely to overestimate dilutions due to the application of a far field model. Please provide further information on the footprint of the cumulative nearfield mixing zone.*

Response

As described above, and in the Dispersion Modelling Report (eCoast, 2019), the modelling results are considered conservative due to:

- The calibrated model slightly underestimated significant wave heights, i.e. a physical factor that aids mixing/dilution;
- A neap tide was used for all scenarios in order to minimise tidal currents and therefore mixing (although there is no inter-dependence between tides and metocean conditions), and;
- The outfall water was released into the top layer of the model providing a conservative approach to initial mixing that occurs as the buoyant plume rises through the water column.

As above, initial dilution modelled occurs in a 1 m deep, 8 x 8 m surface layer – the application of a near field mixing simulation (e.g. PLUME, CORMIX or VIZJET) would likely result in increased mixing/reduced concentration as the outfall boundary condition.

Using the methodology described in the Dispersion Modelling Report and further discussed above, 3 full tidal cycles were modelled to provide the cumulative impacts of the worst-case scenarios. The mixing footprints of these cumulative simulations are in Appendix A of the Dispersion Modelling Report. The mixing zone footprint was delineated based on the cumulative effects of the calm scenarios where a dilution of at least 300x is expected to occur.

Furthermore, an hourly year-long (average-year) dataset was extracted from two locations (inside the mixing zone and at the edge). The results are presented in the figures attached (Attachment 1).

e. *It is noted that the current outfall arrangement (and pipe sizes in the mentioned in the AEE) is likely to be difficult to maintain and depending on diffuser arrangement be affected by layered density flow with the outfall pipes. It is recommended that inline diffusers/risers or diffusers/risers from a T be considered to minimize the discharge foot print. Please comment on this recommendation.*

Response

The outfall arrangement was decided based on an iterative modelling process that included inline discharge perpendicular to the shore. The other arrangements and distances to shore were discarded as they could not meet sufficient dilution criteria. A shore-parallel inline multiple discharge set-up (i.e. T configuration), was not simulated because the model simulations indicate that the buoyant plume moves shoreward in many of the worst-case scenarios (i.e. shore-normal), which would likely result in only a small increase in dilution. The proposed arrangement mixes a discharge spacing both shore-normal and shore-parallel, resulting in higher dilution during all wind/current scenarios. The proposed arrangement is not expected to be any more difficult to maintain than a T set-up.

The outfall is currently only in preliminary design, with three diffusers branching out from the main pipeline. Each of these branches will have a riser with a duckbill valve fitted at the end of it, to avoid any

seawater inflow to the pipes (mostly to avoid sea organism's growth inside the pipes). The discharge is a homogeneous treated wastewater and not expected to cause any layered density flow.

2. Potential effect on water quality

a. *Please advise the below regarding the cleaning products used:*

   i. *The names of the cleaning products*

   ii. *The quantities that will be used*

   iii. *The chemical components of the cleaning products and information on their toxicity to aquatic life*

   iv. *The potential effects on the wastewater to be discharged and their likely concentrations in the wastewater*

   v. *The potential water quality and ecological effects of any chemicals that are discharged into coastal water.*

Response

See attached table (Attachment 2).

b. *Please clarify whether the expected wastewater discharge quality in Table 4.1 is the expected mean, median or another concentration?*

Response

In Table 4.1 of the AEE, the column labelled "Expected concentrations" is the design value for the proposed treatment. There is no direct statistical equivalent, and rather reflect what concentrations should be under normal operating circumstances. For the purposes of a consent condition, these values can be considered as mean values.

c. *Given the open coast location and lack of other anthropogenic activities affecting the coastal water quality, the coastal water quality and environment in this area must be considered of high conservation and ecological value (Australian and New Zealand Guidelines for Fresh & Marine Water Quality (ANZG), 2018). https://www.waterquality.gov.au/anz-guidelines Therefore in terms of using ANZG water quality guideline values for toxicants, the guideline value for*

protecting 99% of species must apply. Please assess the discharge quality against the guideline values protection of 99% of species.

Response

We did not consider it appropriate to directly compare the undiluted discharge against other toxicological guideline values. Some degree of mixing post-discharge will always occur. Irrespective, for completion, we note phosphorus is effectively non-toxic (e.g., >100 g/m^3 as reported in Kim et al 2013), and in lieu of a New Zealand toxicity guideline for nitrate, the CCME (2012) long-term threshold for nitrate is 45 g N/m^3, much higher than the undiluted concentrations considered in the proposal.

The only toxicological value cited in the Water Quality technical report (Babbage report 200028971) is a 99 % protective value for total ammonia-nitrogen (160 mg/m^3, listed in Table 1 of the Water Quality Report pg. 6 as Toxicity - Conservative trigger for high conservation value waters). This value is lower than the 99 %ile value for marine waters in ANZECC (2000), which is 500 mg/m^3 at pH 8. The 95 %ile for total ammonia-nitrogen derived in Batley & Simpson (2009) is 460 mg/m^3. The ANZG (2018) does not have specific guidelines for ammoniacal nitrogen in New Zealand marine waters.

d. *ANZG guidelines recommend data from three sites is used to estimate ambient water quality in an area. Please use data from SQ34749 in combination with SQ35198 to estimate background water quality.*

Response

We did not include Site SQ34749, offshore from the Otaio River mouth, because is more than 25 km north of the proposed outfall, and is north of Wainono Lagoon (and Studholme's proposed outfall). Combining the site data, as shown in Table 1, has an effect on some parameters, such has suspended sediment and turbidity, because the effects of the Waitaki River are dampened. Changes to nutrients are variable.

The revised concentrations at the edge of the mixing zone are presented in Table 2. Overall, the changes are not so great as to affect the current assessment and the implications of the proposal are unchanged. We consider the assessment in the Babbage report does not need revisiting.

Table 1. Revised background values.

Parameter	Units	Median		80 %ile	
Dataset		**SQ35198 only**	**Two sites**	**SQ35198 only**	**Two sites**
Temperature	°C	12.2 ± 0.5	12.8 ± 0.4	15.6	15.6
pH	-	8.00 ± 0.03	8.00 ± 0.02	8.10	8.10
Salinity	‰	25.8 ± 0.9	28.9 ± 0.7	31.7	32.7
Total suspended solids	g/m^3	26.4 ± 4.4	15.0 ± 3.6	35.8	35.0
Turbidity	NTU	10.2 ± 1.5	6.3 ± 1.2	13.6	11.0
Ammonia-nitrogen	mg N/m^3	8.0 ± 1.8	9.0 ± 1.0	15.6	16
Nitrate+nitrate	mg N/m^3	33 ± 6	29 ±5	79	70
Dissolved inorganic nitrogen	mg N/m^3	54 ± 6	44 ± 5	91	83
Organic nitrogen	mg N/m^3	122 ± 10	128 ± 8	160	159
Total nitrogen	mg N/m^3	180 ± 11	175 ±8	260	250
Dissolved reactive phosphorus	mg P/m^3	4.8 ± 0.7	4.3 ± 0.6	9.2	9.1
Total phosphorus	mg P/m^3	22.0 ± 3.0	18 ± 2	37.4	32

Table 2. Revised water quality predictions.

		Normal conditions		Calm conditions		Guideline
Dataset	**Units**	Expected/Mean	95 %ile	Expected/Mean	95 %ile	
Total suspended solids	g/m^3	15.1	15.1	15.1	15.2	35
Ammonia-nitrogen	mg N/m^3	13	**17**	16	**22**	16 / 160
Nitrate+nitrate	mg N/m^3	49	59	62	**79**	70
Dissolved inorganic nitrogen	mg N/m^3	68	74	**84**	**94**	83
Total nitrogen	mg N/m^3	205	215	224	241	250
Dissolved reactive phosphorus	mg P/m^3	8.3	**12.3**	**11.0**	**17.6**	9.1
Total phosphorus	mg P/m^3	22	26	25	31	32

Note: Bold highlighted values are above locally derived guideline trigger value.

e. *In Table 1 of the water quality technical report, there is no water quality guideline for pH. Please comment on whether you agree with ANZECC (1992) which states that in marine waters the pH should not be permitted to vary by more than 0.2 units from the normal values.*

Response

We agree. Based on the expected discharge quality (pH 6-9), the minimal dilution in the edge of the mixing zone (300x for calm conditions – 98%ile), and the background water quality, the expected change in pH would be up to 0.12 units more acidic or up to 0.001 units more alkaline. These changes are worst-case, using the equation described below, since the buffering capacity of the receiving environment (seawater) is substantial, and is not accounted for in this equation.

f. *Using the method described in ANZG(2018) for developing and using locally derived guideline value, the expected (it has been assumed these are the median values) values for dissolved inorganic nitrogen and dissolved reactive phosphorus, and the 95th values for NH4N NNN DIN and DRP in the wastewater will result in an exceedance of the locally derived guideline values at the edge of mixing zone. Please provide details on how the applicant will meet the edge of mixing zone water quality guideline values.*

Response

The locally derived trigger values will not be met for all parameters under all circumstances (i.e., sea conditions and discharge scenarios) at the edge of the mixing zone, as was discussed in the Babbage report on water quality. The ramifications, associated with the potential for more frequent algal blooms, was the focus of the discussion in that report. Ramifications for ecological values are discussed in the Ecological Effects and Marine Mammals Reports, while effects on recreation and human health are discussed in the Recreation Effects and Human Health Risk reports respectively.

For clarity, the concentrations considered at the edge of the mixing incorporated background values. The calculation used was:

$$c_{Mix} = \frac{C_{Dis} * 1 + C_{Sea} * (D - 1)}{D}$$

Where c_{Mix} = Concentration at the edge of the mixing zone in g/m^3

c_{Dis} = Discharge concentration in g/m^3 (Expected/mean or 95 %)

c_{Sea} = Median background water quality in g/m^3

D = Expected dilution (300 in calm conditions, 500 in more typical conditions)

g. *It is proposed to have a holding tank on site, please provide the size of this tank, and how many days wastewater it will hold to avoid discharging during periods of calm weather.*

Response

The onsite holding tank will have a capacity of up to 2,000m^2, however the intent will not be to hold wastewater to avoid discharging during periods of calm weather.

As noted in the modelling report, the calm scenario is relatively rare, and it would require an extended calm period, low discharge water quality (95%ile discharge quality) and substantially increased discharge volume to all occur simultaneously to result in a significantly larger mixing zone; i.e. it is likely to be an infrequent event.

Calm sea conditions rarely last longer than 3-6 hours (less than one event per year longer than 3 hours from 1980 to 2013), and would therefore require local real-time monitoring to be accurately forecasted. It is not considered necessary or practicable to monitor sea conditions in real time at the discharge location, therefore avoiding discharge during calm conditions is not part of the proposed activity.

h. *Please comment on the possibility of bioaccumulation of toxins in invertebrates, fish and marine mammals.*

Response

Safety Data Sheets for the chemicals used within the factory provide variable information regarding potential for bioaccumulation of toxicants in aquatic life. A number of chemicals are toxic to varying levels, however only two have known bioaccumulation risk stated. Chemtroldeox is considered to have a low risk of bioaccumulation, while Emsure Acetone is not expected to bioaccumulate. The remainder are of unknown bioaccumulation risk. For these chemicals with unknown bioaccumulation risk, the potential for them to bioaccumulate within marine life due to the proposed outfall discharge is considered to be low due to the following reasons:

- Treatment is expected to neutralise the majority of the chemicals, however it should be noted Chemtroldeox cannot be eliminated in the biological process plants.
- Following treatment, any chemicals remaining in the wastewater stream will be heavily diluted. See attached spreadsheet (Attachment 2)
- Further dilution occurs once discharge to the marine environment has occurred, as discussed in various technical reports

- There is a low diversity, low abundance invertebrate community in the immediate vicinity, and in the wider area (samples up to 4km from the discharge point), providing limited pathways for bioaccumulating and biomagnifying contaminants to enter the food chain.
- The fish community is of low abundance and limited diversity due to existing habitat restrictions greatly limiting the potential for contaminants to move up the food chain

Concentrations of cleaning chemical residues will be low (1-0.1 ug/L range) at the edge of the mixing zone, as shown in the workings of the attached table. Such trace amounts of cleaning products in the discharge will be too low to to significantly bioaccumulate or otherwise act as biotoxins in the receiving environment.

The principal potential toxicants in the cleaning chemical registry for the site are chemicals that will breakdown into chlorine (hypochlorite-based chemicals) and chemicals that will produce hydrogen peroxide (peracetic acid etc.). Both these product-types will rapidly degrade in the receiving environment, converting to chloride and oxygen (and/or water) respectively.

i. Please comment on whether reduction of the quantity of wastewater discharged by re-use through the plant has been considered.

Response

Water conservation and minimisation of both water consumption and waste water volumes is now a key part of dairy factory and process design.

Where appropriate, with respect to product quality requirements, water is both conserved (i.e. use minimised through close automated monitoring) and re-used. Current forms of re-use are:

- Recovery of the RO retentate, and
- Recovery of caustic cleaning solutions, and
- Recovery of final rinsing flushes

In addition, ODL are currently evaluating the re-use of COW water (water in the milk) to determine if this has any product quality, regulatory or customer implications. Should it prove to be acceptable to use COW water in the process then this provides an additional avenue to further reduce waste water volumes.

j. Please clarify how to the discharge to land consent will be used in combination with discharging to the CMA. I.e. if land conditions are acceptable, will the amount discharged to sea be

minimised, or will the discharge to land be used only when sea conditions (e.g. prolonged calm conditions) do not allow coastal discharge?

Response

The discharge to land will be used during the irrigation season when conditions are favourable (dry weather). The practice is beneficial to the farmers (saving on water and fertiliser usage) and to the factory (reducing required treatment levels to ensure nutrients are still available for plants), and when the receiving soils are not water-logged, nutrient losses are relatively low.

3. Potential effects on coastal birds

a. *The report provides a summary of habitat use, rather than assessing the potential effects of the proposal. Please state the potential effects assessed. Please clarify what methodology was used to undertake this assessment i.e. were the EIANZ impact assessment guidelines used?*

Response

The Environment Institute of Australia and New Zealand have published guidelines for undertaking ecological impact assessments in New Zealand (EIANZ, 2018). The guidelines are specifically written for terrestrial and marine environments where the habitat affected is relatively finite, and easy to identify where it begins and ends. In the marine environment, particularly open coastal areas such as where the proposed outfall will be situated can present very large habitat areas. In the case of this project, habitat is largely similar from Banks Peninsula, south to Oamaru, a distance of almost 200km.

While the EIANZ guidelines are not designed for marine environments, criteria within in them for assigning ecological value, describing magnitude of effect and determining the overall level of affect can be adapted for use in this environment. This method was utilised for the marine assessment of effects and the criteria from that assessment are given below in Table 3, Table 4 and Table 5.

Table 3: Method for assigning ecological values derived from Tables 5 and 6 of EIANZ 2018.

Value	Determining Factors
Very High	Nationally Threatened species found in the Zone of Influence (ZOI) either permanently or seasonally. Area rates as 'High' for at least three of the assessment matters of Representativeness, Rarity/distinctiveness, Diversity and Pattern, and Ecological Context. Likely to be nationally important and recognised as such.
High	Species listed as At Risk – Declining found in the ZOI either permanently or seasonally.

	Area rates as 'High' for two of the assessment matters, and 'Moderate' and 'Low' for the remainder OR area rates as 'High' for one of the assessment matters and 'Moderate' for the remainder. Likely to be regionally significant and recognised as such.
Moderate	Species listed as At Risk – Relict, Naturally Uncommon, Recovering found in the ZOI either permanently or seasonally; AND/OR Locally uncommon or distinctive species. Area rates as 'High' for one of the assessment matters, 'Moderate' or 'Low' for the remainder, OR area rates as 'Moderate' for at least two of the assessment matters and 'Low' or 'Very Low' for the remainder.
Low	Nationally and locally common indigenous species. Area rates as 'Low or 'Very Low' for majority of assessment matters and 'Moderate' for one. Limited ecological value other than as local habitat for tolerant native species.
Negligible	Exotic species including pests, species having recreational value. Area rates as 'Very Low' for three assessment matters and 'Moderate', 'Low' or 'Very Low' for the remainder.

Table 4: Criteria for describing magnitude of effects, from EIANZ 2018.

Magnitude	Description
Very High	Total loss of, or very major alteration to, key elements/features of the existing baseline conditions, such that the post-development character, composition and/or attributes will be fundamentally changed and may be lost from the site altogether; AND/OR Loss of a very high proportion of the known population or range of the element/feature.
High	Major loss or major alteration to key elements/features of the existing baseline conditions such that the post-development character, composition and/or attributes will be fundamentally changed; AND/OR Loss of a high proportion of the known population or range of the element/feature.

Moderate	Loss or alteration to one or more key elements/features of the existing baseline conditions, such that the post-development character, composition and/or attributes will be partially changed; AND/OR Loss of a moderate proportion of the known population or range of the element/feature.
Low	Minor shift away from existing baseline conditions. Change arising from the loss/alteration will be discernible, but underlying character, composition and/or attributes of the existing baseline condition will be similar to pre-development circumstances and patterns; AND/OR Having a minor effect on the known population or range of the element/feature.
Negligible	Very slight change from the existing baseline condition. Change barely distinguishable, approximating to the 'no change' situation; AND/OR Having negligible effect on the known population or range of the element/feature.

Table 5: Criteria for describing the level of effects, from EIANZ 2018.

		Ecological Value				
		Very High	High	Moderate	Low	Negligible
Magnitude of Effect	Very High	*Very High*	*Very High*	*High*	*Moderate*	Low
	High	*Very High*	*Very High*	*Moderate*	Low	Very Low
	Moderate	*High*	*High*	*Moderate*	Low	Very Low
	Low	*Moderate*	Low	Low	Very Low	Very Low
	Negligible	Low	Very Low	Very Low	Very Low	Very Low
	Positive	Net Gain	Net Gain	Net Gain	Net Gain	Net Gain

Ecological values

Intertidal and beach area

Two species were observed using the intertidal area including black-backed gulls and spotted shags, both of which are listed as Not Threatened. No birds were observed feeding in this area with all birds only observed resting. The intertidal zone has limited potential as a feeding resource due to the beach containing substrate too course to support typical intertidal species such as shellfish. It is highly unlikely the intertidal zone or beach presents any nesting habitat as the cobble/shingle/gravel beach is not suitable for birds that frequent the area.

The lack of Threatened or At Risk species, common habitat type, low diversity of avifauna and limited value as a resource to birds means the intertidal area in the vicinity of the proposed outfall presents low ecological value for coastal birds.

Nearshore

Four different species were observed using the nearshore environment (shore out to approximately 200m). These species included black-billed gull (Threatened – Nationally Critical), white-fronted tern (At Risk – Declining), spotted shag and black-backed gull (both Not Threatened). Both gull species, as well as spotted shag were observed resting on the water, while spotted shag as well as white-fronted tern were observed feeding in or over the water. Feeding behaviour was much less common than resting behaviour.

The presence of Threated species prescribes the ecological value for avifauna of the nearshore area as very high.

Offshore

Four bird species were observed using the offshore habitat (greater than 200m offshore). The species included white-fronted tern (At Risk – Declining), spotted shag (Not Threatened), Australasian gannet (Not Threatened), and Arctic skua (Migrant). White-fronted tern, spotted shag and Australasian gannet were all observed feeding either in or over water. Arctic skua were only observed resting on the water.

The numbers of birds observed in the offshore area were significantly lower than the intertidal and nearshore habitat. Only 17 birds were observed during the counts in the offshore area compared to 174 in the intertidal and nearshore area. There were also a number of time periods where no birds were observed in the area at all.

Despite the low bird numbers, the presence of At Risk – Declining white-fronted tern means the area is of high ecological value for birds.

Potential effects

Disturbance during construction

Installing the proposed outfall will result in disturbance to the intertidal area through movement of vehicles, people and potential for excavation and earthworks, and potential disturbance to the marine environment through release of sediment from submarine excavation and/or trenching. This has the potential to temporarily displace birds that use this area for resting, roosting and feeding.

The beach and intertidal area does not present habitat likely to be used by a significant number of birds due to the dynamic nature of the coastline and coarse sediment. Any birds that do use the area, such as the black-backed gulls and spotted shags observed during the assessment, are highly mobile and already move regularly and freely along the coast, and to other habitats including inland areas. These species will be able to easily move to, and utilise alternative habitat during the construction phase, which will be temporary.

The sub tidal zone is utilised by species for feeding including species that hunt underwater such as shags, and species that hunt from the air such as terns. Increased sediment levels in the water generated by construction activities have the potential to limit the ability of birds to find their prey due to decreased visibility. However, the affect will be temporary in nature and limited to a very small area relative to the wider Canterbury Bight habitat. The highly mobile bird species will be easily able to utilise other areas in the immediate vicinity with no detriment to themselves.

The potential for construction to have detrimental effects on avifauna in the intertidal and beach zones is considered to be negligible.

Loss of habitat due to operation

Once commissioned, the proposed outfall will discharge treated dairy factory wastewater to the marine environment. As discussed in the outfall dispersion modelling report[1], it is expected the discharge will be diluted to at least 300 times within 30 metres of the diffusers under all sea conditions, with the distance decreasing with rougher sea and weather conditions. Changes in water quality may result in minor displacement of fish from the area immediately around the diffusers, including the mixing zone, which in turn may result in minor displacement of bird feeding habitat over the same area.

However, as with impacts on fish, the potential effect of the discharge on birds is expected to be negligible due to their highly mobile nature, and the vast majority of similar nearby habitat remaining unaffected by the proposed discharge.

Bioaccumulation

[1] eCoast, 2019, Oceania Dairy Outfall Dispersion Modelling, prepared for Babbage.

The risk of bioaccumulation of toxicants in coastal avifauna is expected to be negligible. Coastal birds can be particularly vulnerable to contaminants as they are long lived and generally at the top of their food chain. Further discussion can be found in the response for question 2h.

Therefore, the potential for these substances to enter the food chain as a result of the outfall, and make their way up the trophic levels to avifauna is considered to be very low.

Table 6 provides a summary of the ecological values for coastal birds in the project area, as well as the expected magnitude of effect resulting from specific activities. The overall level of effect is also given, incorporating the value and magnitude. All effect levels are very low. Generally, only effects with a moderate level or higher require mitigation during construction and/or operation.

Table 6: Summary of the level ecological effects on coastal birds from the proposed outfall and discharge

POTENTIAL EFFECT	VALUE	MAGNITUDE	LEVEL
Construction effects on the beach/intertidal area	Low	Negligible	Very Low
Construction effects on the sub tidal zone	Very High	Negligible	Very Low
Operational effects	Very High	Negligible	Very Low
Bioaccumulation	Very High	Negligible	Very Low

b. *Limitations of the survey – a single day of survey was undertaken. Given the seasonal variability in coastal and seabird habitat use, please provide a rationale as to why a single day of survey was deemed sufficient to obtain the necessary information on which to base the assessment.*

Response

A second day of survey was undertaken on 25 October, 2019. Full results will be forward once they have been collated. No evidence of penguin presence was found.

A single day of survey was considered appropriate after completion of the first day where only a small number of individuals from a very limited number of species were observed using the area around the proposed outfall location.

c. *A map should be provided showing the survey point, the extent of area surveyed and the proposed outfall pipe.*

Response

Figure 1 illustrates the approximate areas where the survey was undertaken. The areas are only approximate as the lack of geographic markers made it difficult to determine exact distances when making the observations.

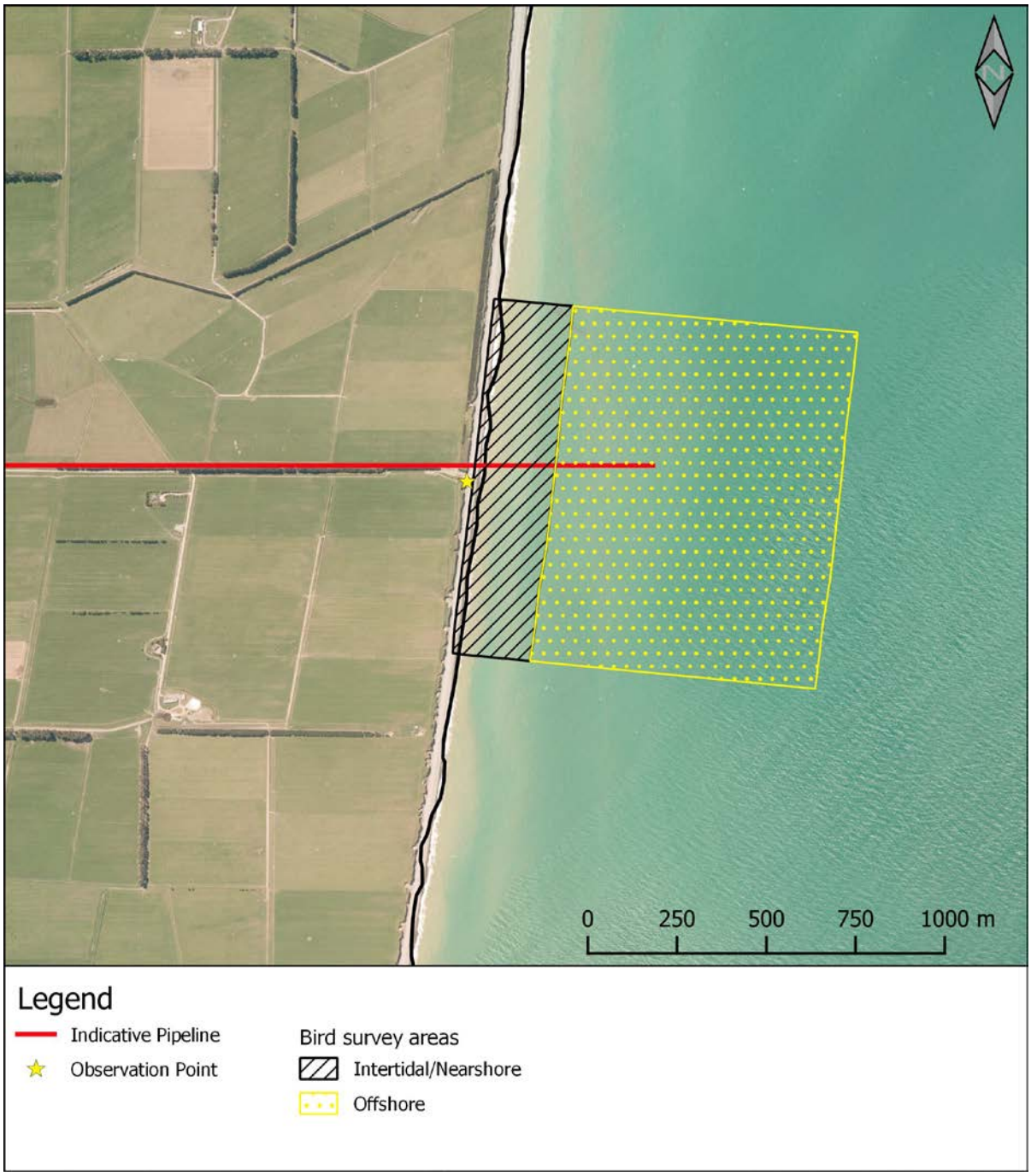

Figure 1: Bird survey areas

4. Potential effects on dewatering discharge

a. *Please clarify how and where the discharge of dewatering water will occur to either land or to surface water, the possible effects of this and how these will be mitigated.*

Response

There will be no direct discharges to any surface water. Dewatering during pipeline construction will occur via wellpointing or open sump pumping. The actual location of dewatering treatment devices will be determined by the appointed contractor at detailed design stage.

The wellpointing method of dewatering consists of a series of small diameter wells (wellpoints) connected by a header pipe that is connected to a pump. The pump draws out water from the wellpoints via the header pipe. For pipeline trenches, wellpoints are typically installed in lines on either side of the trench. The pump will be operated using a deasil generator. Groundwater that is drawn by the wellpointing method is discharged into the irrigation channel or the adjoining land after primary treatment in settling tanks. This will require consents from the irrigation company or the land owners. Alternatively, groundwater drawn from wellpoints can be discharged into the wastewater system after primary treatment.

The sump pumping method of dewatering comprises of excavating a small sump at the downstream of the trench excavated to lay the pipe. Groundwater that drains to this sump is pumped out using a pump. The method for disposal of drawn groundwater is similar to that used in the wellpointing method.

b. *If the discharge occurs to surface water, please confirm that the discharge does not result in more than a 20% change in the rate of flow of the receiving surface waterbody in order for this to be a permitted activity under LWRP Rule 5.99.*

Response

The proposed pipeline trench will have a relatively small depth and width compared to the size of the irrigation lines in the vicinity. Groundwater seepage into the trench is also not expected to be high at the time of construction.

Any dewatering can be managed in a way to ensure that discharges to the nearby irrigation lines do not result in more than 20% change in the rate of flow.

Points of clarification

1. *Please provide written approvals from Waimate District Council for construction of the pipeline within the road reserve.*

Response

Please refer to Attachment 3.

2. *Please clarify the requested duration for consents relating to construction work.*

Response

A duration of 10 years for the earthworks consent is requested. While it is proposed to undertake the work as soon as practicable, the additional time allows will allow flexibility if there are external pressures that mean funding for the project becomes unavailable.

3. *As a cultural impact assessment was not provided with the application and no assessment of the activity against cultural values has been provided to date, please provide an assessment of the proposal against the Waitaki Iwi Management Plan (2019).*

Response

A hui with representatives of Te Runganga o Waihao took place on 26 September 2019. It is understood that a cultural values assessment has been drafted by Aukaha, on behalf of the Te Runanga o Waihao, however it is yet to be finalised.

4. *Please propose conditions for the six consents.*

Response

We are happy to provide draft conditions once we have progressed discussions with the design team. We expect to have this information available for council prior to the end of the notification period.

Yours sincerely

Joe Gray
Planning Manager

Babbage Consultants Ltd

Attachments

Attachment 1 – Hourly dilutions

Attachment 2 – Oceania Dairy Trade Waste Chemical List (excel spreadsheet)

Attachment 3 – Written approval from Waimate District Council

References

Batley, Graeme E, and Stuart L Simpson. "Development of guidelines for ammonia in estuarine and marine water systems." *Marine Pollution Bulletin* 58, no. 10 (2009): 1472-1476.

Canadian Council of Ministers of the Environment (CCME). 2012. Canadian water quality guidelines for the protection of aquatic life: Nitrate. In: Canadian environmental quality guidelines, Canadian Council of Ministers of the Environment, Winnipeg.

Kim E, Yoo S, Ro H-Y,Han H-J, Baek Y-W, Eom, I-C, Kim HM, Kim P, Choi K, 2013. Aquatic Toxicity Assessment of Phosphate Compounds. Journal of Environmental Analysis Health and Toxicity 28 doi: https://doi.org/10.5620/eht.2013.28.e2013002

Attachment 1 – Hourly dilutions

Attachment 2 – Oceania Dairy Trade Waste Chemical List

http://babbage-files.co.nz/Downloads/ODL_chemical_list.XLS

Attachment 3 – Waimate District Council written approval