

BEFORE THE COMMISSIONERS ON BEHALF OF OTAGO REGIONAL COUNCIL

UNDER

The Resource Management
Act 1991

IN THE MATTER OF

Application RM20.280 by
Dunedin City Council for
resource consent for the
construction and operation of a
Class 1 landfill at Smooth Hill

Statement of Reply of Hilary Lennox, Consultant Planner

For the Otago Regional Council

24 May 2022

Introduction

1. My name is Hilary Lennox. I have been processing Consent Application RM20.280 on behalf of ORC since it was lodged in 2020. In the preparation of this report I received technical input from the following technical experts at Tonkin + Taylor Ltd (T+T):
 - Tony Bryce, Senior Environmental Engineering Consultant
 - Andrew Stiles, Geotechnical Consultant
 - Peter Cochrane, Principal Environmental Scientist
 - Sally Lochhead, Senior Hydrogeologist
 - Andrew Pearson, Senior Environmental Consultant
 - Mike Lake, Senior Freshwater Ecologist
 - Josh Markham, Senior Terrestrial Ecologist
 - Richard Chilton, Technical Director – Air Quality

2. Having considered evidence submitted by the Applicant and submitters prior to and during the hearing for this consent application, there are a number of matters that I wish to address in response:
 - A. Clarification of the consents sought by the Applicant
 - B. Technical matters addressed by T+T experts
 - C. Evidence regarding bird strike risk
 - D. Identification of policies that the proposal is or is not still contrary to, and why
 - E. 10-year lapse period sought
 - F. Consent conditions (noting that these are likely to change)
 - G. Conclusion

3. Throughout the course of the hearing I have sought technical input from the technical experts at T+T on various issues. For ease of reference, I have collated the expert responses into this document under the relevant topic headings. Each expert's response on the relevant matter is clearly identified, although some of the responses are in note form due to the limited time available to provide a response. The relevant expert will, however, be available via Zoom to address any questions that the Hearing Panel may have as part of the section 42A Officer Reply.

4. Please note that any references to consent conditions from here on are referring to the condition set that was attached to Mr Dale's evidence.

A. Consents Sought

5. In paragraph 36 of his evidence, Mr Dale agrees with the description provided in the s42A report regarding NES-F and regional rules triggered by the proposal. Questions have, however, been raised during the hearing regarding whether or not the Applicant actually applied for consent under the NES-F.
6. The original consent application, lodged in August 2020, referred to the regulations but did not explicitly seek consent under the NES-F simply because the regulations had been gazetted but had not yet come into force. When the amended application was submitted in May 2021, section 7.2 of the Assessment of Environmental Effects, which is titled '*Applications for Resource Consent from Otago Regional Council*', still referred to the NES-F regulations and noted that they were now in force. It is implicit by reference to the applicable rules that are triggered and the associated activity status that consent was being sought. These references would not be relevant if consents under these regulations were not being sought.
7. In my view, all of the consents detailed in paragraph 36 of Mr Dale's evidence were applied for prior to notification of the application. There is no disagreement between the ORC and the Applicant regarding this matter.
8. The suite of NES-F consents sought in May 2021 included consent for earthworks within a natural wetland for the purpose of upgrading McLaren Gully Road, which is a prohibited activity under regulation 53. It was not until 7 April 2022 (post notification) that the application was further amended to realign the road to avoid the wetlands and, therefore, remove this prohibited activity from the proposal.
9. Questions have also arisen regarding the scope of the land use consent sought under the NES-F. Under regulation 52, earthworks outside, but within a 100 m of, a natural wetland is a non-complying activity if it results, or is likely to result, in the complete or partial drainage of all or part of that wetland. The image provided as Attachment 1 shows a 100 m buffer around the relevant wetlands (original image taken from the evidence of Jaz Morris, with a 100 m buffer added by myself). This shows that earthworks required for the construction of the landfill and the attenuation basin will fall within 100 m of the swamp and west gully wetlands. Whether or not the earthworks activities alone would result in partial drainage of these wetlands is difficult to determine. Nonetheless, the Applicant has applied for a land use consent under regulation 52 for this activity.
10. It is my view that a land use consent is required under regulation 52 for earthworks activities that fall within 100 m of the swamp and west gully wetlands. I cannot imagine what other type of the earthworks activities this regulation is intended to capture, other than large infrastructure projects such as this involving the construction of bunds and dams. There is no disagreement between the ORC and the Applicant regarding this.
11. Should the panel determine that a land use consent is not required under regulation 52 because it will not result in wetland drainage, it should be noted that a land use consent is still required under regulation 54 because the construction of the landfill toe will be within 10 m of the swamp wetland and there is no 'drainage test' under regulation 54. Road upgrade works also trigger the need for a land use consent under regulation 54 where the earthworks fall within 10 m of the roadside wetlands, as shown in the plans attached to Mr Whaley's evidence.

B. Technical Matters

12. Experts from T+T have considered technical matters raised in evidence from the Applicant and submitters prior to and during the hearing. I have liaised with the experts throughout the hearing in relation to issues raised.
13. In the section below I describe the key technical issues that have been raised, and where an expert from T+T has provided a response, I have set this out below in the context of the relevant issue before setting out my own response to some issues.

Limiting the size of the active landfilling face

14. Limiting the size of the active landfilling face has been proposed as a mitigation measure for the purpose of minimising odour and leachate generation, deterring birds, and reducing the risk of fire. Mr Coombe stated that the Applicant would accept a limit of 300 m², but Mr Stacey stated 300 m² was too restrictive from an operational perspective.
15. Tony Bryce, Senior Environmental Engineering Consultant at T+T has provided the following response in relation to what limit could be achieved from an operational perspective, whether there were any examples of this being applied at other landfills, and what the practicalities of monitoring and enforcing this are.

Tony Bryce, Senior Environmental Engineering Consultant

- 15.1 *It is common to have a condition that restricts the active landfilling area as this controls a number of potential effects. Recent consents that I have been involved with at Omarunui Landfill (Hastings) and Auckland Regional Landfill have restricted the active landfilling area or working face to 1,200 m² and 6,400 m² (80 m x 80 m) respectively.*
- 15.2 *The amount of exposed area that is practicable depends on how the tip face is operated. If the landfill is operated with a moving tip face where the trucks drive up to the tip face and place waste where it will remain, then it can be relatively small. This is often difficult to achieve, particularly in wet conditions when maintaining an all-weather surface to the tip face is difficult. A common alternative operating method is to have a semi-permanent tip head with a metaled access route and turning area that will operate for an extended period of time. This requires pushing the waste from the tipping area to its final repository, thus exposing a much greater area of waste on any day.*
- 15.3 *I consider that a limit of 1,000 m² is reasonable, but that 300 m² as proposed by the applicant will become unworkable and will be regularly exceeded.*
- 15.4 *In response to the question regarding monitoring and enforcement, it is relatively easy to measure the area of exposed waste on any day. This would typically only be checked as part of a compliance audit or in response to complaints about other effects such as odour and litter.*

16. In my view, auditing compliance with the respective consent condition (by ORC, the Applicant and/or the landfill operator) on an annual basis and/or in response to complaints

only would be too infrequent given that several mitigation measures are contingent on the size of the active landfilling face being limited, particularly when the local fire danger rating is high or extreme.

17. Because the final condition set is not yet available, I cannot comment on whether the proposed active landfilling face limit seems appropriate, or whether consent conditions provide adequate certainty that this is complied with at all times. What I can say, however, is that conditions 100 and 101 are reasonably certain (with the removal of, 'and on any day when practical it must be reduced in size to not greater than 300 m²'), but it is not clear how these conditions would be monitored and enforced.

Limiting putrescible waste

18. Mr Shaw's evidence provides further assessment of the potential risk of aviation bird strike based on the proposed landfill being a 'non-putrescible facility'. I understand from Mr Shaw's verbal presentation that he considers a landfill receiving no more than 10% putrescible waste would be classed as a non-putrescible facility, but it is not clear whether he is referring to 10% by weight or volume. I have assumed weight.
19. Mr Bryce has provided the following response regarding the putrescible waste percentage for typical Class 1 landfills and whether the Applicant's proposed waste sorting methods (providing households with food and green waste bins and removing gross putrescible waste from the tipping floor of the BWTS) would be sufficient to bring this down to 10%.

Tony Bryce, Senior Environmental Engineering Consultant

- 19.1 *Modern landfills typically have a high component of non-domestic waste, with significant components of contaminated soils, construction and demolition, trade, and industrial waste. Anecdotally, I understand that the Auckland landfills receive only about 20% by weight domestic waste, and Hawkes Bay about 30%. Given that the output from a household without a food waste collection would typically be approximately 50% putrescible, then achieving 10% would seem to be quite achievable, particularly as DCC is proposing a food/green waste collection system.*
- 19.2 *A review of waste data for Green Island Landfill for 2020 identified two waste streams, labelled general waste, that are likely to contain putrescibles. These made up approximately 27% of the total tonnage of waste received which is similar to the Auckland and Hawkes Bay examples cited above.*
- 19.3 *Based on the above I consider that if a food/green waste collection is implemented, a putrescible content of 10% should be achievable. I consider that removing putrescibles from the BWTS tipping floor would only be feasible for loads of gross putrescibles and that it would not be feasible to remove putrescibles that are mixed with general waste.*
- 19.4 *I'm not aware of any examples where a putrescible limit had been applied but noted that there may be a precedent in Victoria, Australia, where they have municipal solid waste and inert solid waste landfills (with no putrescibles). Solid inert waste is defined in the State Environment Protection Policy (Siting*

and Management of Landfills Receiving Municipal Waste) as 'hard waste and dry vegetative material which has negligible activity or effect on the environment'.

- 19.5 *Monitoring and enforcing a putrescible limit could be done with a SWAP analysis, perhaps six monthly or annually. Alternatively, a more empirical approach could be taken, e.g. determine the percentage of total waste represented by the kerbside collection and undertake a limited SWAP analysis on the kerbside collection trucks to calculate the total percent putrescible. Putrescible wastes from other sources would need to be added in.*

Leachate collection system

20. During his verbal presentation, Mr Coombe noted that the life of leachate collection systems can be extended by regular flushing to maintain performance, and a comment was made that perhaps this should be included as a condition of consent. Mr Bryce has provided the following response:

Tony Bryce, Senior Environmental Engineering Consultant

- 20.1 *I would be reluctant to see a consent condition that specified particular details for maintaining the leachate collection system and would prefer that it be left to LMP. This would allow for implementing the most effective method without being restricted by words in a consent condition. This matter could be addressed in proposed condition 12 with wording such as "the leachate collection system must be installed **and maintained...**", and then expanded in the condition 113 with such wording as "the management plan shall include... a description of how the leachate collection system will be maintained and cleaned, including a regular programme for jetting, flushing, or similar."*
- 20.2 *In relation to the potential failure of the leachate collection system, I am generally satisfied with the applicant's proposal, which includes a separation geotextile above the leachate drainage layer, redundancy in the leachate collection pipework, and providing capability for cleaning the leachate pipelines. These provisions will maximise the life of the leachate collection system.*

Liner Specifications

21. During his verbal presentation, Mr Coombe discussed the two liner options presented in the application. He stated that the preference would be for a Type 1 liner but noted that the Applicant would like to retain the option of installing a Type 2 liner if the onsite loess proves to be unsuitable. Mr Bryce has provided the following response:

Tony Bryce, Senior Environmental Engineering Consultant

- 21.1 *By referring to the WasteMINZ guidelines the current proposed condition set already allows for a Type 1 or Type 2 liner to be installed. However, it would be more typical to describe the liner in detail in a consent condition. Typical wording for a condition is set out in the example below.*

Lining System

- 199 The lining system for the landfill on both the base and side slopes shall, as a minimum, comprise one of the following two lining systems:
- f Type 1 Lining system (from top to bottom):
 - i 300 mm layer of leachate drainage material;
 - ii Protection geotextile;
 - iii 1.5 mm HDPE geomembrane; and
 - iv 600 mm compacted soil (clay) with a coefficient of permeability $k < 1 \times 10^{-9}$ m/s.
 - g Or Type 2 lining system:
 - i 300 mm layer of leachate drainage material;
 - ii Protection geotextile;
 - iii 1.5 mm HDPE geomembrane;
 - iv Geosynthetic clay liner (GCL); and
 - v 600 mm compacted soil with a coefficient of permeability $k < 1 \times 10^{-8}$ m/s.
- 200 The Consent Holder may use alternative lining and leachate drainage systems demonstrated to provide equivalent or better performance compared with the specified systems. Use of an alternative lining system shall be subject to prior written approval of the Peer Review Panel and Council.

HDPE Liner

22. In his written evidence, Mr Rumsby queried the Applicant's liner life expectancy estimate of 400 years. Mr Bryce has provided the following response:

Tony Bryce, Senior Environmental Engineering Consultant

- 22.1 *For Auckland Regional Landfill, T+T prepared a technical paper on landfill life and had it peer reviewed by Ed Kavazanjian from Arizona State University (a world recognised landfill expert). T+T concluded that the expected life was between 400 and 700 years and used actual measured waste temperatures from two NZ landfills as part of this assessment.*
- 22.2 *I have reviewed Mr Coombe's written evidence. I am comfortable that it is consistent with the application and good practice. There is just one assumed typo in paragraph 63 where he refers to an elongation of the HDPE liner of 2.0 m (rather than 2 mm) before rupture.*

Loess Liner

23. Regarding questions raised about the use of loess for the landfill liner. Andrew Stiles, Geotechnical Consultant at T+T, and Mr Bryce have provided the following responses:

Andrew Stiles, Geotechnical Consultant

- 23.1 *While loess is classically defined as wind-blown silt, it is often used as a loose term for any silt sized materials. I agree with the Applicant that its use for liner will be acceptable subject to more review and confirmation during detailed design, with overview of the Peer Review Panel.*

Tony Bryce, Senior Environmental Engineering Consultant

23.2 *I am satisfied that the loess may be suitable for liner provided that it can achieve the required permeability. It is similar to soils that have been successfully used for liner in other landfills in New Zealand that I have been associated with. The key parameters to specify in a consent condition are permeability and thickness. Attempting to specify additional parameters may be too prescriptive.*

Leachate Generated from Firefighting Water

24. During his verbal presentation, Mr Judd described how large volumes of water are required to extinguish subsurface landfill fires. This made me question whether the leachate collection system, which has been designed to accommodate leachate volumes generated in response to rainfall, would be adequate to accommodate additional leachate generated in response to dousing the landfill with water to fight a subsurface fire. Mr Bryce has provided the following response:

Tony Bryce, Senior Environmental Engineering Consultant

24.1 *It is inappropriate to design for an emergency situation that may never occur, or occur very infrequently, however, it is essential that a plan be in place for addressing such emergencies, including how water will be managed during a fire emergency. Much of the firefighting occurs with excavators and soil, which reduces the amount of water used. However, the leachate collection system could be temporarily overloaded with water from firefighting. My expectation is that the landfill contingency plan (part of the LMP) would address how this situation would be responded to. This may include using a convoy of tankers to remove leachate, and/or allowing leachate to build up on the liner for a limited period of time.*

25. Based on Mr Bryce's response above, I recommend that condition 110 is expanded to require procedures for managing leachate and overland flow generated through firefighting to be included in the Fire Preparedness and Response Plan.

LFG Oxygen Limit

26. Regarding suggestions from Mr Rumsby that there should be an oxygen concentration limit for the extracted LFG, Mr Bryce has provided the following response:

Tony Bryce, Senior Environmental Engineering Consultant

26.1 *It is unusual in my experience to impose such a limit. Oxygen is introduced to the system through wells with too high a suction where there may be a flow path to atmosphere and often at wells near the working face. LFG is monitored at the inlet of all flares and will shut down the flare if the oxygen content exceeds 5% as an operational/safety precaution. The operator would then investigate which well/wells are drawing in oxygen and shut them down before re-starting the flare.*

27. Based on Mr Bryce's response, I see no issue with imposing an oxygen concentration limit at the inlet of the flares as a consent condition, but note that this would be closely managed by the operator anyway.

Landfill Stability

28. Mr Stiles reviewed the evidence from Professor Stirling and also considered concerns raised by submitters and has provided the following response:

Andrew Stiles, Geotechnical Consultant

- 28.1 *Possible rupture below the landfill has been addressed satisfactorily by Professor Stirling, who stated that in his opinion the likelihood of direct fault displacement [rupture] at the site must be extremely low, with which I concur. I have no concerns regarding deciding on the consent application without the SSPSHA, provided conditions of consent are included that require the SSPSHA to be undertaken, as the SSPSHA will likely show the Akatore Fault to be the dominant seismic hazard.*
- 28.2 *I note that Ms Webb has revised the seismic model to allow for Mr Stirling's seismic assessment, with a peak ground acceleration (PGA) of 0.5 g from the nearer Akatore Fault, rather than the earlier 0.31 g from the (very distant) Alpine Fault.*
- 28.3 *I am also satisfied with Ms Webb's response when questioned on displacement from a seismic event and tolerable range of movement (Ms Webb clarified this as being very small and likely an artefact of the modelling).*
- 28.4 *I support the inclusion of condition 8 (additional investigations), condition 9 (SSPSHA), and conditions 10 and 11 (slope stability) to address gaps in information to ensure that risk associated with the placement of waste are managed appropriately.*

Surface Water Hydrology

29. Peter Cochrane, Principal Environmental Scientist at T+T, reviewed the evidence of Messrs Kirk, Ingles, York and Rumsby, and listened to questions asked of Mr Kirk and Mr Ingles. He has provided the following response:

Peter Cochrane, Principal Environmental Scientist

- 29.1 *The effect of the proposal on wetland surface water levels is the only outstanding issue. The Applicant has calculated that the landfill will effectively intercept up to 20% of the existing annual runoff into the swamp wetland, lower the groundwater table, and reduce groundwater recharge to the swamp wetland, but has not quantified consequential reductions or changes in surface water levels. Mr Kirk has offered additional monitoring of groundwater levels in the wetland areas (which are expected to show a decline in level), but has not offered baseline or ongoing monitoring of surface water levels in the wetland area.*

29.2 *The effects assessment assumes that the Applicant will have enough water available in the attenuation basin to replenish the wetlands when required, but without quantifying how much water levels will be reduced by, it is not clear how the Applicant knows that they will have enough water available.*

29.3 *I have reviewed Mr York's evidence and note that while it contains a great deal of evidence on water quality, it was difficult to make sense of this dataset as abbreviation and measurement units were not included. I consider that Mr Ingle provide satisfactory responses when questioned about Mr York's evidence.*

Water Quality Monitoring

30. My understanding was that trend analysis will be applied to baseline monitoring data to determine background water quality conditions, and that suitable trigger levels will then be fixed to ensure that the landfill 'does not have an adverse effect on water quality' (as per conditions 33(c) and 34(b)).
31. The Commissioners asked Mr Kirk whether the trigger levels set at the end of the 36 month baseline data would be fixed for the duration of the consent, to which Mr Kirk responded that the trigger levels would not be fixed values, rather potential contamination issues would be identified through statistical analysis of trends over time. In my opinion this is not clear in the consent conditions attached to Mr Dale's evidence.
32. Because the final condition set is not yet available, I cannot comment on whether the mechanism for setting and monitoring compliance against trigger levels is likely to ensure that the objective stipulated in condition 33(c) is achieved. Further comment will be provided once Mr Cochrane has had the opportunity to review the final condition set.
33. Mr Cochrane also provided the following responses with respect to conditions:

Peter Cochrane, Principal Environmental Scientist

33.1 *Continuous monitoring of the discharge from the Attenuation Basin as required by condition 27 should include temperature and turbidity, and condition 68 should include the measurement of flow from the Attenuation Basin.*

Groundwater

34. Sally Lochhead, Senior Hydrogeologist at T+T, has reviewed the evidence of Mr Kirk and provided the following response:

Sally Lochhead, Senior Hydrogeologist

34.1 *I acknowledge that the Applicant has provided further clarification regarding the extent of the low permeability stratum that separates the shallow and deeper groundwater systems. Uncertainty remains with the hydrogeological model, but the Applicant has proposed improvements to groundwater (and surface water) monitoring, with additional of monitoring locations at the landfill toe/wetland and 36 months of quarterly groundwater monitoring prior to*

construction. Monitoring at monthly rather than quarterly intervals would still be my recommendation, but I consider monitoring for 36 months to be satisfactory. I acknowledge updates that the Applicant has made to other consent conditions and consider these an improvement.

35. Ms Lochhead also reviewed the evidence of David Ife and Mr Rumsby and has provided the following response:

Sally Lochhead, Senior Hydrogeologist

- 35.1 *Similar groundwater levels in one of the valley bores (BH01) are shown in both the shallow and deep piezometer, which Mr Ife suggests hydraulic connectivity between the two groundwater systems in the valley. The Applicant has identified artesian conditions to exist in the valley in the deeper piezometers, which means an upward hydraulic gradient exists in the Henley Breccia at these locations. Different groundwater chemistry has also been used to demonstrate the separate groundwater systems.*
- 35.2 *Mr Ife has raised concerns that a landfill should not be sited in an area where groundwater meets drinking water standards and this is considered a constraint in the WasteMINZ Guidelines. I agree this is a constraint, but the presence of groundwater which is potable, i.e. meets the drinking water standards, does not prohibit the development of the site. The hydrogeological model presented by the Applicant has shown that there is limited groundwater resource at the site, and the groundwater systems have low flows and low yields with the closest active groundwater consent located over 5 km from the site. I do not consider this to be a concern for the closest active groundwater user based on the information provided by the Applicant.*
- 35.3 *It is Mr Rumsby's opinion that "PFAS compounds make ideal warning compounds of potential leachate impacts". For the monitoring of landfill leachate breakouts in groundwater, there are other primary indicators that are more appropriate to monitor such as ammoniacal nitrogen, conductivity and chloride. These parameters are very mobile in groundwater and would help to determine the presence of leachate in the groundwater. This monitoring is also valid for other monitoring controls that Mr Rumsby proposes rather than the monitoring of PFAS compounds.*

Persistent Organic Pollutants

36. Andrew Pearson, Senior Environmental Consultant at T+T, has reviewed the evidence of Mr Rumsby and provided the following response:

Andrew Pearson, Senior Environmental Consultant

- 36.1 *Mr Rumsby provides reference to PFOS impact sites as an example where PFAS compounds have been shown to mobilise long distances from a contaminant source. These references may be appropriate for understanding PFAS contamination, but we understand that the published information relates to uncontrolled discharges at firefighting training sites and presents a "worst*

case scenario” which is a different environmental setting and situation compared with a new landfill with control measures in place.

- 36.2 *Mr Rumsby comments on the potential for some emerging contaminants/PFAS compounds to bio-accumulate in aquatic food chains and the potential impact on dietary toxicity of macro-invertebrate and fish species. Mr Rumsby identifies that there is incomplete information on this.*
- 36.3 *PFOS and PFOA are poorly cleared (removed) from human and animal systems, consequently they build up over time as exposure is ongoing. Understanding bioaccumulation in aquatic species of PFOS and PFOA has been a key consideration of the New Zealand investigations into contaminated sites.*
- 36.4 *MfE has guidance documents for local authorities reporting on the levels of PFOS and PFOA in freshwater fish, including eels, and understand the risk for different frequencies of consumption. Sites in NZ to date that have required the issuing of advisories to avoid fishing have been due to presence of PFOS in eels from the uncontained discharge of firefighting foams. Other mahinga kai tested around contaminated site, such as watercress and shellfish have shown minimal PFAS. The data is much more limited for short-chain PFAS, however it indicates that although they are more mobile, they don't tend to bioaccumulate in food species or humans to the same degree, hence the health risk is likely lower. The US EPA health guidance values for short chain PFAS are one to two orders of magnitude less toxic than PFOS and PFOA.*
- 36.5 *Key points:*
- *Most POPs listed by the UN will be well contained in the landfill, with MfE analysis for one group (BDEs) supporting this.*
 - *PFAS are more environmentally mobile so can be present at levels in leachate.*
 - *Regulatory interest to date on PFAS in New Zealand has been for 3 substances (PFOS, PFOA, PFHxS), which show a balance of being mobile in the environment and also bio accumulative in wild and food species.*
 - *PFOS, PFOA, PFHxS will have been largely phased out of use in modern societal applications, although they may be replaced with shorter chain PFAS.*
 - *PFOS, PFOA, PFHxS will be present in landfilled waste, and will also form from degradation of more complex PFAS, however levels will decrease in the future.*
 - *Shorter chain PFAS will likely be the more predominant form in landfilled waste into the future. There is no NZ regulatory guidance for these in consumer goods. However, there is indication that although more mobile in the environment they are less bio accumulative and likely less toxic.*
 - *A National Environmental Management Plan is present for PFAS in Australia and NZ. This provides guidance on landfill acceptance criteria for PFOS and PFOA only. The NZ EPA has also issued interim criteria for levels of PFAS going to trade waste.*

- *The National Environmental Management Plan notes future work is ongoing in respect to the diffusion of PFAS through landfill liners and role of other PFAS types and will be updated once available.*

Freshwater Ecology

37. Mike Lake, Senior Freshwater Ecologist at T+T, (who has visited the site) reviewed the written and verbal evidence of Dr Blakely and has provided the following response:

Mike Lake, Senior Freshwater Ecologist

- 37.1 *Dr Blakely presented new information when she revealed that the downstream environment appears to be very similar to that upstream of McLaren Gully Road, and that it is essentially a wetland/intermittent stream for a further 3 km. This information is helpful in understanding the wider environment. Given that there are no perennial watercourses within the likely zone of impact, I consider that any potential shift in the transition from intermittent to perennial watercourse attributable to hydrological effects of the proposed landfill is likely to be immeasurable. As a result, I consider that the Applicant's proposal to undertake baseline ecological and surface water monitoring, develop appropriate triggers, and then undertake post-construction monitoring through the FWMMP is a more practical means of estimating stream loss than measuring stream loss directly.*

38. Mr Lake reviewed Dr Lloyd's evidence and provided the following comments:

Mike Lake, Senior Freshwater Ecologist

- 38.1 *Paragraphs 17-21: Dr Lloyd's evidence outlines that there are high ecological values within the wider Ōtokia Creek and especially in the lower reaches. I agree with this assessment but note that the receiving environment of the proposed landfill is located within the heavily modified headwaters of the Ōtokia Creek catchment and it is, therefore, not surprising that it supports much more limited ecological values than would be found close to the coast. This is a similar view to that expressed by Dr Blakely in her evidence presented at the hearing.*
- 38.2 *Paragraphs 39-42: Dr Lloyd is critical of the EIANZ framework, largely on the basis that it is subjective. In my view all ecological impact assessments all have an unavoidable element of subjectivity and the EIANZ framework, while not perfect, does provide more consistency and transparency than would be the case if it were not used. This is a similar view to that expressed by Dr Blakely in her evidence presented at the hearing.*
- 38.3 *Paragraph 52: Dr Lloyd made some recommendations regarding monitoring in downstream reaches. In my view most of these can be managed through the FWMMP. Both Peter Cochrane and I support the inclusion of sediment monitoring as a way of detecting potential contamination that may not be picked up in water quality monitoring and I recommend that it*

be explicitly included within the baseline (70) and FWMMP (71) consent conditions to ensure that it is implemented (see below)

Terrestrial Ecology

39. Josh Markham, Senior Terrestrial Ecologist at T+T, (who has visited the site) reviewed the written and verbal evidence of Dr Morris and provides the following response:

Josh Markham, Senior Terrestrial Ecologist

- 39.1 *It is still unclear how Dr Morris reached the conclusion that without mitigation, the impacts to these wetlands would be considered a low level of ecological effect and that these wetlands are resilient to hydrological change. I agree that wetlands respond to seasonal variation in water supply, however, I do not agree that they are resilient to this change as weed incursions typically result. Dr Morris has stated that the VRMP and restoration of the wetlands will make them more resilient to hydrological change. I note that this depends on how much of a hydrological change is experienced and where it is experienced within the wetland. For instance, if hydrological change results in drying of parts of the wetland closest to the landfill toe or parts up gully then it is likely that wetland plants that require “wet feet” would die out resulting in weed incursion.*
- 39.2 *This point is also raised in paragraph 49 of Dr Morris’ evidence, which highlights a contradiction. I disagree with the point made in paragraph 16 but do not consider it material when considering conditions 68, 70 and 71, and the outcome that is sought through these conditions.*
- 39.3 *Regarding paragraph 43 and 47 of Mr Morris’ evidence, I consider that assuming a 20% change in surface water run-off from reforestation is over simplified as it depends on the quantum of area impacted and how / where this changes inputs into the wetland and the same applies to reforestation. These paragraphs contradict the conclusion in paragraph 14 that without mitigation there would be a low level of ecological effect, hence conditions 68, 70 and 71 are justified.*
- 39.4 *Regarding paragraph 51, “any appreciable” portion seems vague and difficult to qualify. The interpretation of this statement could mean that a level of impact is acceptable provided that it doesn’t impact the entire wetland. Would, therefore, drying 5%, 10% or 20% of the wetland margins be an appreciable change to trigger offset / compensation action? Conditions 68, 70 and 71 will help to determine this.*
- 39.5 *Regarding paragraph 66, I consider that if wetland monitoring identifies an indirect impact, then offsetting using the BOAM, BCM or other comparative method would be required. It is, therefore, important that the condition set is robust and enforceable. Based on the information presented to date, I disagree that a form of biodiversity accounting is no longer required.*

- 39.6 *Regarding paragraphs 69 – 71, as per above statements, I do not consider there to be clear understanding of what the residual adverse effects are.*
- 39.7 *Regarding paragraph 72, depending on the scale of the adverse effect, and what measures are taken in terms of increasing biodiversity value, the remedial action may end up in another location and would, therefore, be considered offset or compensation.*
- 39.8 *Regarding paragraphs 73 and 74, I agree that models assist in the process and allow a transparent and robust method to follow that can be tested against assumptions, and further notes that the conditions need to reference these models, future versions of these models, or other suitable best practice methods. This would hopefully provide the future proofing that Dr Morris is looking for within paragraph 74 and 80.*
- 39.9 *Regarding paragraphs 82 and 83, it seems that Dr Morris is explaining the worst-case scenario that has been questioned through the process. I consider that well-constructed conditions would ensure appropriate action is identified, but that an earth bund across the lower gully is not necessarily the solution.*

40. Mr Markham has reviewed Ms Sievwright's evidence and has provided the following response:

Josh Markham, Senior Terrestrial Ecologist

- 40.1 *I accept her argument regarding scale in terms of eastern falcon. I agree with the intent of amending condition 66 to ensure that if mortality of nesting falcon occurs it will trigger action, but note that the wording in the consent condition needs to be robust and enforceable, and that it is not clear how mortality of nesting falcon could actually be remedied, offset or compensated.*

41. Mr Markham has reviewed Ms King's evidence and has provided the following response:

Josh Markham, Senior Terrestrial Ecologist

- 41.1 *Ms King generally accepts the need to apply adaptive management if more lizards are found than expected (i.e. then the impact would also be greater than expected). Southern grass skink can be found in high density in isolated areas so the need for adaptive management and a process to quantify if any further offset / compensation is required.*
- 41.2 *Regarding paragraph 55 of Ms King's evidence, T+T didn't develop the BOAM, rather it was developed by DOC and it has been peer reviewed and widely accepted. It is possible that Ms King is referring to the BCM, which T+T did develop. Reference in consent conditions to these models, future versions of these models, or other suitable best practice methods, would address Ms Kings concerns regarding future movement in best practice.*

42. Mr Markham has reviewed Dr Lloyd's evidence and made the following comments:

Josh Markham, Senior Terrestrial Ecologist

- 42.1 *Paragraphs 25, 26 and 27: A similar concern that we have raised, which still hasn't been addressed. Conditions 68, 70 and 71 aim to bridge this gap in information in terms of wetland effects.*
- 42.2 *Paragraphs 31, 32 and 33: I agree with these statements but am generally comfortable that this detail can come at the certification of the management plans. Pest control standards are well described and understood.*
- 42.3 *Paragraph 34: This is the very reason why we use BOAM / BCM models; without the use of BOAM / BCM there is no way of assessing the effectiveness of the VRMP or if the desired ecological outcome has been reached.*

43. Mr Markham has reviewed Mr Ife's evidence and made the following comments:

Josh Markham, Senior Terrestrial Ecologist

- 43.1 *Paragraphs 112, 113, 114, 115 and 116: Infers the same conclusion as we have reached; inadequate information so management plans that set out clear standards / triggers need to be used to ascertain residual effects. The difference is that we are wanting clear standards / triggers and methods in conditions.*
- 43.2 *Paragraphs 117 and 118: Highlights concerns that we have raised during the application process ("Given the paucity of detail it is simply not possible to assess whether management measures to be adopted at the site will be sufficient to manage the risks")*

44. I asked Mr Markham and Mr Lake whether any of the evidence presented by the Applicant changes any of the conclusions reached in the s42A report and their responses are summarised as follows:

44.1 Mike Lake, Senior Freshwater Ecologist

There is still some uncertainty regarding how surface water flows will respond to the establishment of the landfill, but baseline ecological and surface water monitoring, development of appropriate triggers, and post-construction monitoring through the FWMMP is a more practical means of estimating stream loss than measuring stream loss directly.

Josh Markham, Senior Terrestrial Ecologist

- 44.2 *There is still some uncertainty regarding how the hydrology of the wetlands will be affected, and there still isn't enough specific information on the tolerance of these wetlands to make a conclusion regarding the quantum of ecological effects. It is, however, possible that monitoring of these wetlands and the use of offset and compensation tools could appropriately address residual adverse effects.*
- 44.3 *There is still disagreement regarding the level of detail required in terms of effects on lizards, avifauna, wetlands, and vegetation. However, the overall*

level of ecological effects should still be manageable and able to be offset or compensated for. It is, therefore, possible that agreement could be reached on appropriate conditions that require the use of offset and compensation tools to appropriately address residual adverse effects.

45. Any further comment is reserved until Mr Lake and Mr Markham have had an opportunity to review the final condition set.

Air Quality

46. Richard Chilton, Technical Director – Air Quality at T+T, reviewed the evidence of Mr Stacey and Mr Welsh and has provided the following response;

Richard Chilton, Technical Director – Air Quality at T+T

46.1 *There was nothing contained within the evidence of Mr Stacey or Mr Welsh that has changed my previous conclusions. Mr Stacey appears to agree with my earlier recommendations regarding consent conditions. I have also reviewed the condition set attached to Mr Dale's evidence relating to the air discharge permit and consider them to be appropriate.*

47. Ms Irving suggested that if condition 48 were reworded as follows (or similar) then this would go some way to alleviating submitters' relating to odour:

There must be no odour or dust beyond the boundary of the site that is noxious, dangerous, offensive or objectionable in the opinion of an authorised officer of the Consent Authority.

48. I consider this to be suitable and agree that it may provide more certainty for those that could be impacted by the discharge of odour from the site.

C. Bird Strike Risk

49. Potential risk to aviation activities has been a key matter discussed in the hearing. The Applicant and submitters are all in agreement that no increase in risk is acceptable; the unresolved matter is, therefore, whether or not the Applicant's proposed bird management strategy will achieve this objective, and whether or not consent conditions can be imposed to provide adequate certainty.
50. I have identified what I understand (from the evidence of Messrs Garbett, Henderson, Shaw, and Dale) to be the key components of the Applicant's bird management strategy and considered whether these can be guaranteed/controlled/enforced through consent conditions. This is discussed in the following paragraphs.

Offsite Actions

51. Both Mr Shaw and Mr Garbett have stated that managing the ~3,000 BBGs currently foraging at the Green Island landfill is a key part of the Applicant's bird management strategy. Mr Shaw stated that prior to opening the new landfill, management of BBGs at Green Island should be phased in to reduce the numbers feeding there. Simultaneously, restricting breeding of BBG at breeding colonies should commence to reduce the overall population size in the region. At paragraph 22 of his evidence, Mr Shaw states that a management plan for the regional population of BBGs, with a focus on Green Island Landfill is, in his view, necessary.
52. The evidence presented to date does not explain exactly how the Applicant proposes to manage the BBGs at Green Island. The evidence of Mr Shaw indicates that once BBGs become established at a site, it is very difficult to get rid of them. The draft Bird Management Plan mentions deterrence, but no further detail is given regarding what that involves, when it will commence, who will be responsible, what minimum outcome must be achieved, or how success will be measured. Without this information it is not possible to impose a clear, certain, practical, and enforceable consent condition requiring management of BBGs at Green Island.
53. It may be possible that the Applicant volunteers a condition when the final condition set is submitted, however, I cannot yet comment on how suitable and enforceable that condition might be or whether it will go any way towards alleviating submitters' concerns.
54. Section 3.3.3 of the draft Bird Management Plan states that colony control involves culling birds and / or breaking or pricking eggs at nesting colonies. Mr Shaw stated that there are probably about 10 significant colonies in the area, but it is not yet known where they are. It is also acknowledged in the draft Bird Management Plan that culling BBGs may not be perceived favourably by some, and that discussions with DOC and the Otago branch of the Ornithological Society of New Zealand are recommended to determine their receptiveness.
55. The Applicant has not detailed who will be responsible for colony control, what minimum outcome must be achieved, how success will be measured, or who even owns the subject sites. Without this information it is my opinion that a clear, certain, practical, and enforceable condition of consent cannot be imposed through the Smooth Hill consent requiring the Applicant to undertake regional BBG colony control. Even if the Applicant

volunteered such a condition, it cannot be imposed for sites that the Applicant does not own or occupy.

56. Condition 80 includes colony control as one of the proposed management actions. It is my opinion that, for the reasons detailed above, this action cannot be enforced through the Smooth Hill consents unless it was intended to apply to colonies on the site itself, which I do not understand to necessarily be the case.
57. When questioned by the Commissioners, Mr Shaw stated that the proposed mitigation to be implemented at Smooth Hill alone (i.e. with no bird control at Green Island or colony control elsewhere) would still achieve the outcome of there being no increase in existing avian risk. I initially found this statement to be contrary to other comments Mr Shaw and Mr Garbett made regarding the importance of managing the Green Island and other BBGs as part of the Applicant's wider bird management strategy. After further reading, however, I now assume that Mr Shaw believes that the Smooth Hill landfill will result in *no increase* in the existing risk regardless of what is done elsewhere, but that concurrent management of Green Island's BBGs and colony control elsewhere might result in the existing risk *decreasing*.
58. For the reasons given above, the remainder of my assessment focusses on components of the Applicant's bird management strategy that apply to the subject site itself.

Putrescible Waste Limit

59. Section 6.4.2 of the s42A report concluded that additional treatment prior to discharge was an alternative that could be had regard to in this situation when determining whether or not consent should be granted. Since the s42A report was written, the Applicant added Attachment 3 to the proposed condition set detailing how incoming waste streams will be further treated prior to discharge.
60. The Applicant and DIAL agree that Smooth Hill should be a non-putrescible facility. DIAL seem to prefer a zero putrescible waste target, but Mr Henderson stated that achieving 100% removal of putrescible material would be impossible. Mr Shaw indicated that 10% putrescible waste would be sufficient to ensure that the landfill is non-putrescible 'from a bird's point of view'. This target has been offered by the Applicant in Attachment 3 of Mr Dale's evidence.
61. Chair of Commissioners, Mr van Voorthuysen has indicated that much of the methodology outlined in Attachment 3 would be better placed in the LMP, but that management plans are not the appropriate location for limits, standards or requirements. With this in mind, I recommend that the putrescible waste limit is moved from Attachment 3 and imposed as a condition of consent instead. Compliance with this consent limit should, according to Mr Shaw, go a long way in helping to ensure that the landfill is not an attractive foraging ground for birds. Whether or not this limit alone would be adequate to address the risk of bird strike is discussed further below.
62. Two potential options for monitoring this compliance limit are described in paragraph 19.5 above, but neither provide real-time monitoring of the putrescible component of the waste stream (although I am not sure how critical that is). That said, either or both methods could possibly form part of a more robust monitoring regime that includes monitoring of highly odorous wastes too.

63. Attachment 3 of Mr Dale's evidence states that the putrescible waste stream will be reduced to 5% over time, but the Applicant has not indicated what additional measures will be implemented to achieve this, or specified the timeframe, so I have not given it any further consideration.

Limiting the Active Landfilling Face

64. Mr Shaw stated that the size of the active landfilling face is inconsequential if the 10% putrescible waste target is achieved, but Attachment 3 states that quarantined waste must be covered immediately. I can, therefore, only assume that limiting the active landfilling face will add value and note that it is also a proposed mitigation measure for minimising odour and leachate generation and for reducing the risk of fire.
65. This is discussed further in paragraph 17 above, where I conclude that this can and should be imposed as a condition of consent, but that a robust monitoring regime has not yet been identified. Whether or not this limit alone would be adequate to address the risk of bird strike is discussed further below.
66. I note that condition 43(e) states that highly odorous wastes will be covered within 30 minutes. From the evidence presented, it is my understanding that highly odorous wastes should be treated in the same way as quarantined waste to minimise the risk of attracting birds i.e. it must be covered immediately.

Lethal Controls

67. Condition 79 states that the number of BBGs killed by shooting and poisoning must be recorded, but Condition 80 states that all species >50g (my emphasis) must be controlled by shooting and poisoning.
68. Ms Takau's submission states that lethal measures for bird control is not consistent with the aspiration of Te Rūnaka to protect taoka species and indigenous biodiversity. Ms Sievwright responded to this by stating that only BBGs would be shot. When questioned about this tension, Mr Ellison confirmed that BBGs are considered taoka species and so the preference is to minimise harm to them as far as possible.
69. Based on the above, I have found it difficult to assess whether or not the Applicant's bird management strategy can be enforced through consent conditions. I have a number of outstanding questions:
- Is it possible to manage BBGs without using lethal control methods?
 - If not, how can the Applicant ensure that only BBGs will uptake poison?
 - How will the operator know how many BBGs have been killed through poisoning when there is no guarantee that they will die onsite?
 - Will any other bird species >50g be controlled through lethal methods?
 - Will the presence of 20 or more non-BBG individuals >50g result in rapid escalation past the second tier of control (lethal methods) into the third tier of control (installation of wires / bailing of waste)?
70. My understanding from the evidence presented to date is that, for example, should 20 or more red or black-billed gulls be observed at the site, the Applicant must immediately

install wires above the active landfilling area and start bailing waste because these birds cannot be controlled by lethal methods. This is unlikely to be implemented immediately and so perhaps problematic waste will need to be diverted for a period. This is described further in paragraphs 71 - 73 below.

Installation of a Net

71. Condition 80 proposes installation of a net over the active landfilling area as a management action in the event that all other measures have not been effective. In his verbal evidence, Mr Shaw acknowledged DIAL's concerns that there may be some delay in installing the net and advised that there may need to be diversion of problematic wastes in the meantime.
72. In my opinion this approach is not too dissimilar in intent to the condition suggested following condition 65 in Attachment 5 of the s42A report¹, which required landfill operations to cease if bird numbers were not being managed to a certain level.
73. Either way, I consider it appropriate to require the consent holder to cease the discharge of all problematic (putrescible) wastes in the event that a net (or wires – see above) is required, and that this waste must not be accepted again until the net is commissioned. This level of detail is not included in the current condition set.

Conclusion

74. The paragraphs above raise concerns regarding the enforceability of a number of key components of the Applicant's proposed bird management strategy. This adds to concerns raised by others during the hearing regarding the complexity of the proposed management plan, delays in escalating actions, how to ensure that the bird management plan is implemented effectively throughout the duration of the 35-year term sought, and potential tension for the landfill operator when reporting on bird sightings that could result in operations being impeded.
75. The only controls that I consider to be certain and enforceable are imposing a putrescible waste limit and limiting the size of the active landfilling face, although robust monitoring programmes for these controls have not yet been identified.
76. The additional evidence provided since my s42A report was written has not affected my conclusion regarding the potential risk of bird strike.

¹All bird species specified in the Bird Management Plan greater than 50 g feeding at the landfill or accessing waterbodies must be managed to zero densities daily. If this is not achieved over 3 consecutive days, then the landfill operation must cease, and material covered (including netting if necessary) until zero densities of birds over 50 g can be reached over 5 consecutive days.

D. Further Policy Assessment

77. Rather than undertaking another comprehensive policy assessment in light of evidence received before and during the hearing, I felt that it would be more helpful to the Commissioners for me to focus on explaining which policies I consider that the application is still contrary to, and why.

78. *PORPS Policy 4.3.3 - Functional needs of infrastructure that has national or regional significance. Provide for the functional needs of infrastructure that has regional or national significance, including safety.*

Under the definitions in the PORPS, Dunedin International Airport is classed as both nationally and regionally significant infrastructure. There is a very high risk to the functional needs of the Dunedin International Airport from the proposed activities. The risk of bird strike has not been adequately assessed and as a result the Applicant's wider bird management strategy is not sufficiently developed, nor can it be enforced in its entirety through consent conditions.

79. *PORPS Policy 4.3.5 – Protecting infrastructure with national or regional significance. Protect infrastructure with national or regional significance, by all of the following:*
a) Restricting the establishment of activities that may result in reverse sensitivity effects;
b) Avoiding significant adverse effects on the functional needs of such infrastructure;
c) Avoiding, remedying or mitigating other adverse effects on the functional needs of such infrastructure;
d) Protecting infrastructure corridors from activities that are incompatible with the anticipated effects of that infrastructure, now and for the future.

In regards to a), Ms Mehlhopt, Counsel for Otago Regional Council will address the matter reserve sensitivity, but it should be noted that the assessment in my s42A was made on the basis that airports and municipal waste landfills are inherently incompatible. Whether or not the proposal is contrary to clause a) is, however, somewhat immaterial because it is still contrary to clauses b) – d).

80. *PORPS Policy 4.6.9 New contaminated land. Avoid the creation of new contaminated land or, where this is not practicable, minimise adverse effects on the environment.*

I do not agree with Mr Dale's statement that this policy needs to be considered in the context of policies 4.6.7 and 4.6.8, because if the landfill was being established on an already-contaminated site then it would not be contrary to this policy.

81. *PORPS Policy 5.4.3 Precautionary approach to adverse effects. Apply a precautionary approach to activities where adverse effects may be uncertain, not able to be determined, or poorly understood but are potentially significant or irreversible.*

The Applicant's conclusions are supported by a limited programme of investigations, resulting in a lack of certainty that adverse effects will be avoided, remedied, mitigated, offset or compensated. Some of this uncertainty could be managed through consent conditions, but the Applicant's proposed conditions are not currently sufficiently developed to provide this certainty. Granting the application in its current form would, therefore, be contrary to this policy.

82. Regarding PORPS Policy 4.6.8 and PRPS Policy HAZ-CL-P18, I note that I have misinterpreted clause e) and (4) respectively, which would apply to the establishment of further sensitive activities in the area once the landfill is operational. The proposal is still, however, inconsistent with clause b) and clause (1) of these policies (which relate to ensure / avoid adverse effects on health and safety of people).
83. Regarding IM-P15 (Precautionary approach), HAZ-CL-P15 (contaminated sites) and EIT-INF-P15 (Protecting nationally or regionally significant infrastructure), I still believe that the application is contrary to these policies, but consider that greater weight should be given to the PORPS. The PRPS policies are not a material departure from the equivalent provisions in the PORPS.
84. *RPWaste Policy 7.4.11 To minimise the adverse effects of discharges from new and operating landfills by requiring that... the siting... of new and operating landfills is in accordance with the Waste Minimisation Institute New Zealand's Technical Guidelines for Disposal to Land (August 2018).*

Section 4.4 guidelines states that an assessment of the suitability of a site for a landfill should consider airport safety, and that the Civil Aviation Authority 'Guidance Material for land use at or near airports' (2008) notes that the International Civil Aviation Organisation (ICAO) Bird Control and Reduction Manual recommends that [municipal solid waste landfill] sites be located no closer than 13 km from the airport property. I appreciate that the guidelines do not prohibit this activity, but the recommendation is a strong indicator that the two activities are incompatible.

85. In summary, I consider that the proposal is still contrary to Policies 4.3.3, 4.3.5, 4.6.8, 4.6.9 and 5.4.3 of the PORPS, Policies IM-P15, EIT-INF-P15, HAZ-CL-P15 and HAZ-CL-P18 of the PRPS, and Policy 7.4.11 of the RPWaste,
86. Regarding other policies that I previously assessed the proposal as being contrary to, I suspect that suitable consent conditions can be drafted to alleviate outstanding concerns but will reserve judgement until the final condition set has been reviewed.
87. I have not yet revisited my assessment of cultural values policies in light of evidence provided regarding the culling of BBGs not being consistent with the aspiration of Te Rūnaka to protect taoka species and indigenous biodiversity.

E. Lapse Period and Consent Duration

88. As a correction to my section 11.2 of my s42A report, I can confirm that the Applicant did seek a lapse period of 10 years. Mr Henderson advised that the Applicant is seeking to replace the Green Island landfill consents to extend its operational life until 2029 (7 years away) and so the Applicant would need to be in a position to start to discharge waste at Smooth Hill by then if an alternative solution has not been found. It could be argued that a 7-year lapse period is more appropriate in this situation, but I consider this to be of little consequence.
89. The exception to this is the water permit to abstract and use groundwater. Plan Change 7 was introduced with the intention that all new water permits would have a duration of no more than 6 years so that they would be reconsidered under the new Land and Water Plan when that is made operative. If a 10 year lapse period is applied to the water permit sought, then it is possible that this consent would not expire until 2038, which is inconsistent with the intent of PC7 and is, therefore, not recommended.
90. I note in the evidence of Mr Dale that unlimited consent terms are sought for land use activities that trigger regulations 52 and 54 of the NPS-F. I consider that this is unnecessary and that a consent duration more reflective of the predicted construction period should be applied. I have consulted with ORC's Consents Manager who confirmed that this is ORC's preference.

F. Consent Conditions

91. The Applicant will be providing a final condition set after this report is presented and prior to the hearing closing and so I reserve further comment on consent conditions until this condition set has been provided by the Applicant. I am happy to work with Mr Dale so that the final condition set provided to the Commissioners indicates whether there are any unresolved areas of concern or disagreement.

General Comments

92. The Commissioners have indicated that conditions controlling effects on terrestrial ecology (namely clearance of habitat for eastern falcon and lizards) should not be placed on the discharge permits sought from ORC, and would be better placed on a land use consent instead. In paragraphs 9 – 11 above I have identified the physical extent of activities that require a land use consent under the NES-F and agree that this is somewhat limited spatially relative to the entire landfill footprint. However, the ORC discharge and diversion of water permits will apply to the entire landfill footprint and whilst it might not be conventional for conditions controlling effects resulting from habitat clearance to be included on a discharge permit, I see no reason why the Applicant cannot volunteer these consent conditions. If the applicant chooses to withdraw their volunteering of these conditions, effects on terrestrial ecology will still be a matter for consideration for the NES-F land use consents.
93. The only other location for the eastern falcon and lizard conditions would be on the outline plan for the site, which ORC cannot enforce.
94. Mr van Voorthuysen has indicated that consent conditions relating to the design, construction and operation of the landfill are better placed on a land use consent. In my opinion, these conditions would be very well placed on the discharge permits sought because this all forms the package of mitigations to ensure that adverse effects from these discharges (to land, air and water) are managed appropriately. The landfill is designed, constructed and operated specifically with the aim of achieving this objective, and so without such controls then there is no guarantee that adverse from the discharges will be within the scope of that assessed.
95. Mr van Voorthuysen has raised similar concerns regarding conditions 8 – 10. As discussed in paragraph 28.4 above, these consent conditions are required to address gaps in information to ensure that risk associated with the discharge of waste are managed appropriately.
96. Regarding the structure of the consents, for simplicity and ease of administration and compliance, I would recommend:
- s.15 discharge consent for the discharge of contaminants and water to land and water;
 - s.15 discharge consent for the discharge of odour, dust and LFG to air;
 - s.14 water permit to dam, divert, take and use water;
 - s.9 land use consent for vegetation clearance and earthworks.

These four consents would cover all of the activities that require consent under the Regional Plan: Water, Regional Plan: Waste, and the NES-F.

97. The Commissioners have suggested that it may be appropriate to require a bond. I am supportive of a condition requiring a bond and can provide further comment once I have received the Applicant's final condition set.

Detailed Comments

98. The following points are provided in the interim in response to the condition set attached to Mr Dale's evidence:
- Condition 6: Add "of the works referred to in this condition" to the end of this condition.
 - Condition 21: The groundwater permit needs to specify the daily (87 m³/day) and annual (1,600 m³/yr) allocation sought.
 - Condition 27(b): The location of these piezometers needs to be assessed by a hydrologist / hydrogeologist.
 - Condition 28: Are the four new shallow groundwater monitoring bores (condition 27(c)) missing from this table? Text is also missing from the bottom line of the table.
 - Condition 34: Doesn't include any trigger levels / standards. Furthermore, the RWEMP needs to be certified that it is adequate to ensure that the objectives in condition 33 are met.
 - Condition 56: Is this meant to refer to condition 59 rather than condition 60?
 - Condition 58: Peer Review Panel will need to review the LGFRA and advise whether it is adequate to ensure that objectives a) – d) are met.
 - Condition 60: How often will the monitoring results be reported and how promptly will exceedances be investigated?
 - Condition 65: Text that has strike out should be retained with the wording "future versions of these models or other suitable best practice methods".
 - Condition 66: What's the bottom line? Other measures recommended by Ms Sievwright (avoiding breeding season and measures for working within breeding season including the 200 m buffer) seem to be missing. How do you remedy/offset/compensate mortality?
 - Condition 67: What's the bottom line? Regarding a) there seems to be an omission that they don't know what the values, and so, therefore, is offset / compensation needed? Needs to outline standards around pest control and habitat enhancements. Is d) meant to refer to condition 72, not 71?
 - Condition 68: What's the bottom line? Need standards around the monitoring used to determine the extent of the existing wetland habitat and indigenous plant values. What are the management objectives that the trigger levels are meant to align with?
 - Condition 69: The evidence of Dr Morris states that there will be overall net gain, but the bottom line in this condition is no net loss. Disagree with the strike through in (ix). It is not clear why the plan needs to be certified in terms of aviation risk for birds. Would it better to quantify the total area to be restored / managed rather than relying on a draft plan that is already outdated?
 - Condition 70: Support this in principle as way of ensuring an accurate estimate of baseline conditions is established. Recommend the explicit inclusion of longitudinal depth profiling of the channel under high baseflow conditions to allow a correlation between depth at the SW3, SW7 and SW8 monitoring points and

so that water depth within the watercourse channel can be established. This will assist with developing a more meaningful trigger levels for aquatic biota. Also recommend the inclusion of sediment quality monitoring to establish background levels of contaminants of concern (see comments on Dr Lloyd's evidence).

- Condition 71: What's the bottom line? There is still some uncertainty as to how the hydrological triggers will be developed and residual effects will be managed. It will, however, be difficult to resolve that uncertainty without an understanding of the baseline conditions.
- Condition 72: Needs to include standards for pest management and areas.
- Condition 74: Food and garden waste is to be minimised but not prohibited, which is what this condition currently suggests.
- Condition 75: "to the extent practicable" isn't enforceable.
- Condition 76: Based on evidence presented by Mr Shaw, Mr Markham does not see this being particularly effective but sees the need for it to be an option.
- Condition 88: Accidental discovery protocol condition should be reinstated in case of unknown archaeological sites being discovered.
- Condition 100: Would it be helpful to include a definition or some examples for what would be considered "combustible"?
- Condition 110 should be expanded to require procedures for managing leachate and overland flow generated through firefighting to be included in the Fire Preparedness and Response Plan.

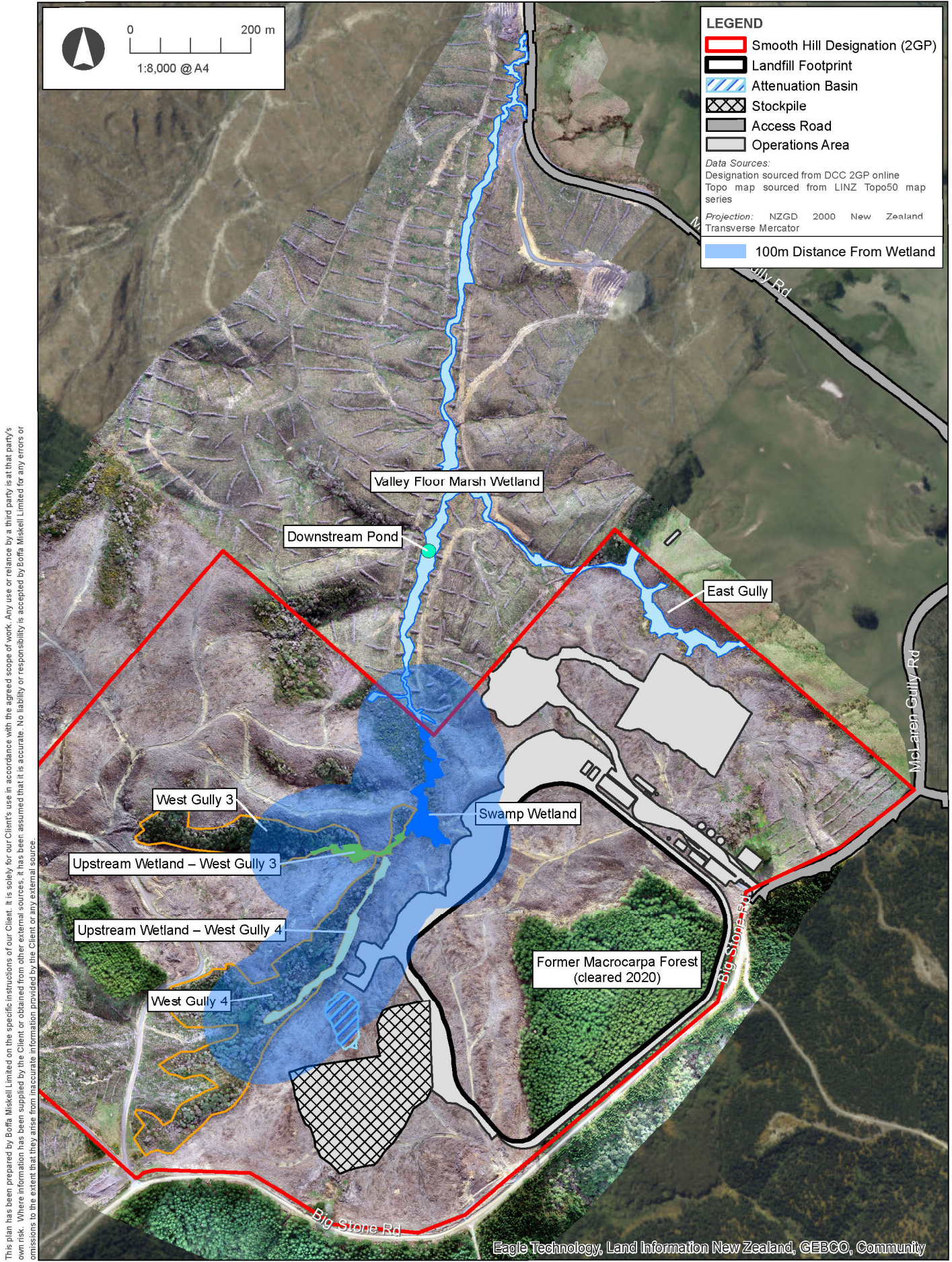
Please note: These points are in addition to comments made elsewhere in this report:

G. Conclusion

99. In this report I have responded to matters to the extent that I am able but reserve further comment on consent conditions until the final condition set has been provided.
100. Based on the information provided to date, I my recommendation to refuse the application in its current form still stands on the basis that:
- Having regarding to s104(1)(a) and (ab) of the RMA, the actual and potential effects from the proposal (risk of bird strike) are considered on balance to be significant;
 - Having regard to s104(1)(b) of the RMA, the proposal is contrary to Policies 4.3.3, 4.3.5, 4.6.8, 4.6.9 and 5.4.3 of the PORPS, Policies IM-P15, EIT-INF-P15, HAZ-CL-P15 and HAZ-CL-P18 of the PRPS, and Policy 7.4.11 of the RPWaste; and
 - Having regard to s104(1)(c) and s105(1)(c) of the RMA, disposal at an alternative location and additional treatment prior to discharge are alternatives that could be had regard to in this situation when determining whether or not consent should be granted.
101. Further treatment is discussed in paragraphs 60 – 63 above (removal of some domestic food/green waste and gross contamination of organics from the BWTS tipping floor), but quarantined waste and other problematic (highly odorous) wastes may need to be disposed of elsewhere if enforceable conditions relating to bird management are not offered.

Hilary Lennox
24 May 2022

Attachment 1: Activities within 100 m of swamp and other wetlands



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Attachment 1 - Activities within 100 m of swamp and other wetlands