Green Island Landfill

Otago Regional Council Decision Report

9 April 2025

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1.0 Introduction

1.1 Appointment

[001] The Otago Regional Council (**ORC**) appointed independent commissioner Rob van Voorthuysen to hear and decide resource consent applications lodged by Dunedin City Council (**DCC**) for the ongoing use, extension, closure, and aftercare of the Green Island Landfill (**GIL**).

1.2 Activity description

[002] The activities for which consents are sought, the historic development of the GIL, how the GIL is currently managed, the proposed future operation and management of the GIL, and the surrounding area and receiving environment were described in the application documents, DCC's evidence and legal submissions[1], ORC's Notification Report[2] and ORC's Section 42A Report[3].

[003] I adopt those descriptions without repeating them here, but I refer to elements of them in subsequent sections of this Decision. Particularly informative descriptions included:

- ORC's Notification Report, section 3 'Description of Activity', section 4[4] 'Description of Environment', and section 5 'Status of Application';
- The evidence of ORC peer review experts Tim Baker[5] and Peter Wilson[6]; and
- The evidence of DCC experts Dusk Mains[7], Mary Wood[8] and Maurice Dale[9].

[004] Readers of this Decision are encouraged to refer to the above documents to gain a full understanding of the GIL proposal.

1.3 DCC Waste Management Programme

[005] Sandra Graham[10] and Christopher Henderson[11] outlined DCC's role in waste management[12], the Waste Futures programme[13] that was initiated in early 2018, the Waste Minimisation and Management Plan, the financial planning for the extension and closure of the GIL and the engagement undertaken as part of that process.

[006] I chaired the 2022 hearings for DCC's Smooth Hill Landfill and so I am familiar with the matters outlined by Ms Graham and Mr Henderson and the relationship between the GIL, the Green Island Resource Recovery Park[14] to be located at Green Island that was consented in January 2025, and the yet to be developed Smooth Hill Landfill. Importantly, Ms Graham advised[15] that it was unlikely that Smooth Hill will be ready to accept waste until 2029 at the earliest, necessitating the ongoing use of the GIL until then. She also outlined[16] the funding that was committed in the Council's nine-year plan for the improvements required by the consent conditions that DCC had recommended for the GIL.

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[1] Legal submissions on behalf of Dunedin City Council, 13 March 2025.
[2] ORC Notification Recommendation Report, Shay McDonald – Senior Consents Planner, 12 November 2025.
[3] Otago Regional Council, Section 42A Staff Recommending Report, Application RM23.185 Dunedin City Council, Shay McDonald, Senior Consents Planner, 25 February 2025.
[4] Excluding section 4.1
[5] Section 5 titled "Site Conceptualisation".
[6] Section titled "Current State of the Receiving Environment".
[7] EIC Mains, paragraphs 16 to 21.
[8] EIC Wood, paragraphs 17 to 22.
[9] EIC Dale, paragraphs 19 to 25.
[10] DCC CEO
[11] Group Manager DCC Waste and Environmental Solutions Group.
[12] Including DCC's new enhanced kerbside collection service that was rolled out in July 2024.
[13] Waste Futures is intended to reduce the amount of waste going to landfill overall and, in the case of food and garden waste, to reduce the amount of putrescible waste contained in the general waste stream.
[14] This involves waste diversion facilities including an organics processing facility, a mixed recyclables sorting facility, a plastics granulation facility, a centrally located rummage store and a bulk waste transfer station.
[15] EIC Graham, paragraph 25.
[16] EIC Graham, paragraphs 27 to 29.

1.4 Management plans

[007] As is common for major infrastructural projects such as this, the DCC intends to rely on several management plans that will be submitted to the ORC for certification. Mr Dale discussed the Landfill Development and Management Plan (**LDMP**), Landfill Closure Management Plan (**LCMP**) and Adaptive Management plan (**AMP**) that are referred to in the consent conditions, as well as the Landfill Operations Plan **(LOP**) that will be maintained by the landfill operator. I have no issue with the intended use of these management plans.

2.0 Process matters

2.1 Written approvals

[008] Written approvals were provided from Colin and Maryanne Mulcahey and Tina Conway, whom I understand to be the occupiers of DCC owned dwellings neighbouring the GIL site.

2.2 Notification and submissions received

[009] The applications were publicly notified and four submissions were received:

- Colin Weatherall (support)
- Colin and Carol Venables (neutral)
- Otago Fish and Game Council (neutral)
- Te Rūnanga o Ōtakou (neutral)

[010] I record that I read and had regard to the submissions.

[011] Prior to the Hearing Te Rūnanga o Ōtakou advised[17] that they no longer wished to be heard, because the concerns raised in their submission had been addressed by Ms McDonald's recommended amendments to the conditions offered by DCC, including a framework for engagement between DCC and Te Rūnanga o Ōtākou regarding the operation and final closure of the GIL.

[012] The remaining three submitters spoke at the Hearing.

2.3 Site visit

[013] I undertook a site visit on the afternoon preceding the Hearing accompanied by Tamsin Grigg (ORC Consents Support Coordinator) and applicant representatives Rachael Eaton (Boffa Miskell) and Conor Mulcahey (Waste Management Ltd).

2.4 Hearing

[014] I conducted a Hearing in the Auditorium at Toitū Otago Settlers Museum commencing on Tuesday 18 March 2025. Copies of the evidence and legal submissions that were presented are held by the ORC. I do not summarise that material here, but I refer to it in the remainder of this Decision where appropriate. I took my own notes of any answers to questions that I posed.

[015] The DCC's Reply submissions were received on 3 April 2025. I closed the Hearing on 4 April 2025, having concluded that I required no further information from any of the participants.

2.5 Consents required

[016] The following regional and national instruments are relevant:

- Regional Plan: Water for Otago (**RP:Water**)
- Regional Plan: Waste for Otago (**RP:Waste**)
- Regional Plan: Air for Otago (**RP:Air**)

[17] Email from Tim Vial (Senior Planner, Aukaha) dated 27 February 2025.

- Resource Management (National Environmental Standards for Freshwater Regulations) 2020 (**NES-FW**)

[017] DCC sought the following consents:[18]

- RM23.185.01: Discharge Permit to discharge waste, hazardous waste and leachate onto land, in a manner that may result in contaminants entering groundwater.
- RM23.185.02: Water Permit to take and use groundwater and connected surface water from the Kaikorai Stream through a leachate collection trench and to take and use groundwater and leachate from groundwater bores, landfill gas wells and a leachate collection trench.
- RM23.185.03: Water Permit to divert surface water and stormwater from working and non-working areas of the landfill.
- RM23.185.04: Water Permit to permanently divert surface water in the Kaikorai Stream and Brighton Road Stream.
- RM23.185.05: Discharge Permit to discharge surface water and stormwater to the Kaikorai Stream.
- RM23.185.06: Discharge Permit to discharge contaminants (landfill gas, combustion emissions from landfill gas flares and engine, dust, and odour) to air.
- RM23.185.07: Land Use Consent to place a defence against water along the Kaikorai Stream for the purpose of diverting floodwaters.
- RM23.185.08: Land Use Consent to disturb a contaminated site for the purpose of undertaking capping works and installation and maintenance of landfill infrastructure.

[018] DCC sought a consent duration of 35 years for all of the consents, except for the water permit to take groundwater for which a 6-year duration was sought in order to comply with Policy 10A.2.2 of the RP:Water.[19]

[019] Ms McDonald listed the relevant rules triggered by the applications.[20] It was common ground between Ms McDonald and Mr Dale that in applying the commonly accepted 'bundling principle', the GIL proposal has a discretionary activity status. However, the replacement water permit required under RPW 10A.3.1.1 is a controlled activity and the conditions I can impose on that consent are limited to the specified matters of control.

[020] Ms McDonald and Mr Dale also agreed that a separate resource consent may be required under the NES-FW for the installation of new monitoring wells given their proximity to natural wetlands. Mr Dale advised that would be applied for separately in advance of those wells being installed.

3.0 Assessment Approach

[021] The GIL is currently operative and has existed in its current location since 1954. The site is designated for landfill purposes. It would be fanciful to suggest that the GIL should be removed upon its closure or that the generation of leachate from it should somehow be required to cease. Accordingly, I agree with Ms McDonald[21] that:

> *Not granting these consents would not result in a better environmental outcome. There is no ability to 'turn off' the discharges; leachate will continue to be generated in waste, and stormwater will continue to run off the surface of the landfill. Recognising that waste disposal is a necessary activity, it would be consistent with the purpose of the Act to enable the continuation of landfilling at the Green Island Landfill until the modern Smooth Hill Landfill is commissioned.*

[18] ORC Section 42A Report, section 2.1 titled "Overview".
[19] ORC Section 42A Report, Attachment 2.
[20] ORC Notification report, section 5.1.
[21] Section 42A Report, page 51 of 68.

[022] Consequently, my focus has been to establish robust, practical and enforceable resource consent conditions that give effect to RP:Waste Policy 7.4.3 which states a general requirement for landfills to be "*… managed in a manner whereby adverse effects on the environment are avoided, remedied, or mitigated*."

[023] Consent conditions are necessarily informed by technical information and expert assessment. DCC produced a voluminous amount of technical material in support of its applications. That technical information was subject to (and responded to by the DCC) several s92 requests for further information and the resulting totality of DCC's technical information was peer reviewed by experts engaged by the ORC. Statements of technical evidence authored by the ORC peer reviewers[22] were pre-circulated prior to the Hearing. Similarly, the experts[23] engaged by the DCC pre-circulated evidence.

[024] I have read all of that technical evidence. The ORC peer reviewers and the DCC experts answered questions of clarification that I posed prior to the Hearing[24] and those that I had questions for attended[25] the Hearing.

[025] Consequently, in this Decision I have generally only dealt with matters of disagreement between the technical experts. In doing so I have had regard to the RP:Waste assessment criteria for landfills that are generally relevant to effects assessments. These are criteria 7.6.1.2(g) and (h) which respectively read:

> *(g) The characteristics of the receiving environment including the current and likely future uses of that environment including residential activities;*
>
> *(h) The mitigation measures, safeguards, and contingency plans to be undertaken to prevent or reduce the actual and potential adverse environmental effects including on residential activities;*

[026] I note that the RP:Water and the RP:Air do not contain similar 'assessment criteria', although they do of course contain objectives and policies that I have had regard to.

3.1 Permitted baseline

[027] When forming an opinion for the purposes of subsection 104(1)(a) of the RMA I may disregard an adverse effect of the activity on the environment if a national environmental standard or a plan permits an activity with that effect.[26] There is no permitted activity rule for the discharge of contaminants to land, water, or air arising from the operation of a landfill and so I have elected not to disregard any effects of the GIL proposal. Mr Dale agreed[27] that the permitted baseline was not relevant here.

3.2 Landfill cap

[028] Mr Elliot initially suggested that the grade of the final landfill cap should be increased to 5%. At the Hearing he suggested that areas of existing cap that were below a 5% grade (he referred to some areas being at a 2% grade) should be brought up to a 5% grade by recontouring and that all new areas of cap should be at a grade of 5%. Mr Roberts and Mr Dale considered that the conditions should require the final cap to achieve a grade of 4% or greater *"as far as practicable",* because the final grade could not be confirmed until final waste volumes were known.

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[22] *James Elliot*, Technical Director Land Quality and Remediation; *Dominic Trani*, Technical Director Geotechnics and Mine Waste Engineering; *Tim Baker*, Technical Discipline Manager Hydrology and Hydrogeology; *Pete Wilson*, Principal Consultant Ecology and Marine Science; *Elizabeth Morrison*, Principal Ecologist; *Rachael Annan*, Technical Director Landscape Planning; and *Tracy Freeman*, Principal Air Quality Specialist.

[23] Robbie (Adrian) Roberts (GHD Technical Director and Associate - waste containment), Dusk Mains (GHD Technical Director - hydrogeology), Mary Wood (GHD Associate - stormwater), Peter Stacey (Air Quality Consulting NZ Limited), Simmone Eldridge (Tonkin and Taylor Technical Director – landfill gas), Anthony Dixon (GHD Technical Director – landfill fires), Debbie Fellows (GHD Technical Director and Principal – geology), Dr Tanya Blakely (Boffa Miskell Senior Principal and Technical Leader - ecology), Dr Kylie Dodd (GHD Technical Director – human health risk), Sue McManaway (Boffa Miskell Principle Landscape Planner) and Maurice Dale (Boffa Miskell Senior Principal and Planner).

[24] I precirculated written questions to the ORC peer reviewers (Minute 2) and the DCC experts (Minute 3) and those questions were answered prior to the Hearing.

[25] Experts for whom I had no questions were excused attendance.

[26] Section 104(2) of the RMA.

[27] EIC Dale, paragraph 37.

[029] While I am generally not in favour of subjective consent condition wording, I find Mr Roberts' and Mr Dale's approach to be appropriate in this case because:

- The GIL is not expected to exhibit significant differential settlement post closure because the waste currently located in its footprint has been in place for a considerable period of time and has already consolidated[28];
- DCC will continue to own the GIL site and will have staff on site at the RRP post closure, enabling ongoing monitoring and maintenance of the landfill cap, including remediating low spots by removing the vegetation and subsoil layers and backfilling with compacted clay to re-establish a suitable grade[29]; and
- Slight deviations from a 4% grade are unlikely to cause stormwater ponding to such an extent that it will percolate through the 1.45-meter-thick final capping layer.

[030] Regardless, the conditions require the cap to "*be graded and incorporate drainage so as to prevent ponding of stormwater and erosion and cracking of the capping surface*." I find that to be a suitably clear outcome.

3.3 Leachate head and leachate extraction

[031] Leachate is produced by the decomposition of waste and by rainfall percolating through the waste. The DCC experts (Roberts and Mains) acknowledged that GIL leachate levels are currently high in some areas and in the past leachate breakouts had occurred. However, they expected leachate levels would reduce as the landfill was progressively capped[30] and horizontal leachate drains were installed.

[032] Mr Elliot was concerned about high leachate levels in the landfill and the potential for leachate migration. He proposed conditions requiring a leachate pumping trial because pumping out leachate was one means of reducing its level. Mr Roberts recommended that the leachate pumping trial be included as part of the Landfill Development Management Plan. If a pumping trial was required it would be undertaken to inform an adaptive management approach to any leachate management issues that emerged at the site[31].

[033] Ms Mains did not think a pumping trial was necessary in light of the proposed groundwater and surface water monitoring for leachate indicator contaminants and the slow rate of any potential leachate migration. While acknowledging that leachate breakouts had previously occurred, Ms Mains considered that if monitoring identified a significant leachate breakout, a further characterisation of any potential leachate plume should be undertaken (involving additional groundwater investigations) prior to determining the best mitigation options[32]. That would be detailed in an Adaptive Management Plan to be certified by the ORC. Ms Mains' step wise approach seems preferable to me.

[034] In that regard Mr Dale noted[33] that a leachate pumping trial could be one outcome of the Adaptive Management Plan if there was evidence of leachate migration to the Kaikorai Stream. At the Hearing I asked DCC to 'flesh out' the Adaptive Management Plan conditions with examples of the mitigation actions that might be employed should a leachate breakout occur. I note that listing examples of mitigation actions was also sought by Fish and Game representative Nigel Paragreen[34]. I find listing possible mitigations in the Adaptive Management Plan is preferable to undertaking a leachate pumping trial at this stage.

[035] Debbie Fellows recommended[35] that Ms McDonald's deleted consent condition that detailed the operating levels of the leachate head within 40m of the landfill margin should be reinstated, because leachate levels

[28] Opening Legal submissions.
[29] Ibid.
[30] A third of the main landfill has been capped with a low permeability cap that was completed in 2022 (EIC Main, paragraph 29).
[31] Opening Legal submissions.
[32] Including sheet piling or leachate head reduction.
[33] EIC Dale, paragraph 42.
[34] Environmental Officer for the Otago Fish and Game Council.
[35] EIC Fellows, paragraphs 20 and 21.

were a critical influencing factor on the slope stability of the landfill embankments. I agree and I have reinstated Condition 10 in RM23.185.01.

3.4 Leachate trench

[036] The leachate collection trench running around the perimeter of much of the landfill creates a hydraulic barrier to groundwater and leachate migrating offsite. Continuous dewatering of the trench is required to maintain this barrier, with pump stations set to maintain low water levels in the trench, thereby creating a hydraulic gradient that directs groundwater and leachate to the trench. Leachate pumped from the trench is piped to the Green Island Wastewater Treatment Plant (**GIWWTP**) for disposal. It was common ground that the leachate collection trench and associated leachate pump stations should be extended along the southern side of the landfill.

[037] There was some debate about the effectiveness of the leachate collection trench and whether or not leachate might currently be migrating off site. However, the implications of that relate to appropriate monitoring conditions which I discuss later in this Decision.

[038] Ms Fellows confirmed there were no areas of disagreement on geotechnical matters, however, she considered that the leachate pipe rather than the leachate trench should be designed with resilience to a ULS seismic event. I agree.

3.5 Monitoring and trigger levels

[039] Importantly, Ms Morrison and Ms Blakely appeared to agree that it was unlikely that the continued operation and closure of the GIL would result in direct impacts on freshwater ecology and in particular it was unlikely that the ecological health of Kaikorai Stream and estuary would be adversely affected. Consequently, no ecological monitoring was required. Nevertheless, Ms Blakely advised[36] that as a precautionary approach to ensure the leachate collection system continued to adequately contain and remove leachate from the landfill, continued groundwater and surface water monitoring was proposed. I agree that ongoing groundwater and surface water monitoring is essential.

[040] Mr Baker and Ms Mains agreed that an additional groundwater monitoring well cluster[37] should be located at the southwestern edge of the GIL. Ms Mains[38] suggested that this cluster of wells be constructed on the bund between the two southwestern ponds. At the Hearing Mr Baker advised he agreed with that suggestion. I viewed that area on my site visit and find Ms Mains' suggestion to be reasonable.

[041] Mr Baker recommended additional deep wells at bore Lines 1 and Line 3 and advised his Line 1 recommendation had been actioned through new well BH103. Ms Mains did not consider that additional wells were necessary at Line 3 if the new bore cluster outlined above was installed. She considered Line 3 to be a lower risk in relation to historic flow paths[39], but was[40] "*open to a review condition following 3 years of monitoring of the new well cluster and BH103*". I note that the final conditions offered by DCC in Reply include criteria that would trigger a new deep well at Line 3 which is appropriate[41].

[042] There was disagreement about the groundwater and surface parameters that should be monitored and set out in Table 1 of the pre-hearing General Conditions. Ms Woods recommended that monitoring parameters for the sedimentation ponds and groundwater should be tabulated separately and be focused on high-risk contaminants of concern in the receiving environment[42], rather than the broad suite proposed in Ms McDonald's General Condition Table 1.

[36] EIC Blakely, paragraphs 16 and 20.
[37] With three wells each screened in different layers (UKEM, LKEM and mudstone).
[38] EIC Mains, paragraph 26.
[39] Based on estuarine channels visible on aerial photographs prior to the GIL infilling the estuary.
[40] EIC Mains, paragraph 42.
[41] Now General Condition 51(d).
[42] Including PFOA/PFOS and VOC/Semi VOC.

[043] Mr Baker recommended setting leachate indicator triggers levels based on Guideline values. Ms Woods proposed[43] using the previous five-year record of sampling results to establish trigger levels (based on three standard deviations from mean). Ms Mains considered that trigger levels should only be set for contaminants of concern, which did not include chloride, calcium or sodium.

[044] I agree with setting trigger levels as there is no point monitoring water quality around the GIL just for the sake of it. I consider that wherever possible, trigger levels should be set for the contaminants that are clearly indicative of the presence of leachate.

[045] Ms Mains and Ms Woods recommended removing Table A1 (the contaminant trigger levels recommended by Mr Wilson based on various guidelines) from the General Conditions and including them instead in the Landfill Development Management Plan and Landfill Closure Plan. I do not favour that approach as it provides limited regulatory certainty. Instead, trigger levels based on guideline values for key leachate indicator contaminants should be explicitly stated in the conditions of consent along with the actions that would follow should those trigger levels be breached.

[046] At the Hearing I expressed concern that Table 1 in the pre-hearing General Conditions was confusing and requested that it be amended to separate out leachate, groundwater, surface water and the sedimentation ponds. I also suggested setting out in Table 1 both the relevant guideline limit for contaminants along with the specification of trigger levels based on the previous five-year record of sampling results in order to prevent the occurrence of 'polluting up to a guideline value' if the current level of contaminant was below the guideline value. The experts all agree with that approach, as did Mr Paragreen for Fish and Game.

[047] However, the applicant's Reply submission conditions did not adopt that approach. I found the Reply submission tables of monitoring parameters and associated General Conditions 41 to 47 to be unnecessarily complex. Any disagreement between the DCC experts and ORC peer reviewers on the parameters to be monitored and the need for trigger levels was briefly set out in 'track changes' comment boxes which I did not find to be overly helpful.

[048] Consequently, I have:

- Simplified the tables of parameters (contaminants) for leachate, groundwater, surface water and the sediment ponds. Those are now labelled tables 1 to 4 respectively;
- Specified which parameters should have trigger levels, based primarily on the evidence of Mr Baker, Mr Wilson, Ms Woods and Ms Mains;
- Included Mr Wilson's guideline-based trigger levels in a new Table 5 for relevant parameters;
- Included a new General Condition 43 requiring trigger levels to be the lesser of the mean plus three standard deviations for parameter concentrations measured during the previous 5 years of monitoring (mean plus and minus three standard deviations for pH) or the trigger values specified in Table 5; and
- Included a new General Condition 44 requiring the trigger levels to be recorded in the Landfill Development Management Plan and Landfill Closure Management Plan and for any trigger levels based on the mean plus three standard deviations to be updated when those management plans are respectively reviewed in accordance with General Conditions 9 and 14.

[049] In terms of the trigger levels I have:

- Focused the requirement for trigger levels on key parameters that would indicate the presence of leachate (metals) or are important in terms of human contact recreation (including faecal bacteria) or aquatic health (including dissolved oxygen and metals);
- Opted for trigger levels based on historical data to be the mean plus three standard deviations in order to be consistent with the approach adopted for the Smooth Hill landfill;
- Required trigger levels for parameters where there appeared to be agreement between the experts;

[43] EIC Woods, paragraph 47.

- Required trigger levels for PFOS, PFOA, *E.Coli and Enterococci* (in surface water) as recommended by Mr Wilson. In terms of the concern expressed by Ms Woods about doing that, I note that assessment of the effects of any exceedance of those trigger levels is only required under General Condition 48 if contaminant concentrations at those sites downstream of the landfill also exceed the concentrations detected at surface water sites upstream of the landfill;
- Not required trigger levels for the major ions in surface water (Table 3) because as noted by Ms Mains, those major ions will be influenced by sea water and are not contaminants of concern with regard to leachate;
- Not required trigger levels for suspended sediment, boron or chloride in the sediment ponds (Table 4) because as noted by Ms Woods, those ponds are not receiving water bodies. However, trigger levels are required for suspended solids and boron in the surface water receiving environment (Table 3); and
- Included sodium, potassium, calcium, bicarbonate and sulphate in Table 3 (surface water) as recommended by Mr Wilson and agreed by Ms Woods, but not required trigger levels for those parameters because as noted by Ms Woods those parameters are not contaminants of concern but instead relate to general water chemistry.

[050] In making these findings I was conscious of the need to focus on the main issue of concern, which was the detection of leachate and its effects on the receiving environment.

[051] Ms Woods did not consider the Northern Leachate Pond needed to be monitored while it was connected to the leachate system. That seems reasonable as the leachate in that Pond is conveyed to the GIWWTP. After landfill closure that pond will become the Northern Sedimentation Pond and she considered it should then be monitored along with the other ponds on the site[44]. I agree.

[052] Ms Blakely considered it appropriate to include a requirement for ecotoxicology investigations (or ecotoxicity testing) in the Adaptive Management Plan if leachate was confirmed to be migrating offsite and entering the Kaikorai Stream. In my questions to the DCC experts and the ORC peer reviewers I queried the purpose of undertaking ecotoxicity testing. From their helpful answers I am satisfied that ecotoxicity testing will assist with determining whether or not the leachate is having an adverse effect on the receiving environment. It is therefore appropriate to refer to ecotoxicology investigations in conditions of consent for the Adaptive Management Plan. However, I agree with Ms Blakely[45] that ecotoxicology investigations should focus on establishing the chemical characteristics (or composition) of the leachate, and to test the toxicity of the leachate on aquatic fauna.

3.6 Leachate flow monitoring

[053] Ms McDonald considered that because the combined leachate and groundwater pumped from the infiltration trench under Water Permit RM23.185.02 were indistinguishable, and the proposed rate of take was between 5 L/s and 20 L/s, the pumped take should be metered as provided for in the Resource Management (Measurement and Reporting of Water Takes) Amendment Regulations 2020. She also recommended that telemetry be installed to record the combined pumped flows at 15-minute intervals and that the data be sent to the ORC.

[054] Ms Mains considered[46] that because the groundwater take associated with the leachate trench was very small (≈ 1-2 L/s) with no associated impact on other groundwater users and a negligible effect on surface water flows, detailed monitoring of the pumped flows was unnecessary and a requirement to measure and report leachate pumped volumes as part of the required annual report was sufficient.

[055] Mr Dale observed that the average 5 L/s and maximum 20 L/s rate of take recommended by Ms McDonald for Water Permit RM23.185.02 captured not only the take of groundwater and leachate, but also stormwater

[44] EIC Woods, paragraph 35.
[45] DCC answers to Minute 3.
[46] EIC Mains, paragraph 45.

runoff that was directed to the leachate collection system. He considered that the Regulations were not intended to capture stormwater discharges.

[056] This matter was addressed in the Reply submissions and Mr Garbett conceded[47] that the Regulations did apply to the groundwater take associated with the leachate trench. I have therefore included Condition 4 in Water Permit RM23.185.02, largely using the wording in the conditions attached to the Reply submissions. I accept the Reply submissions[48] that the approach in Condition 4 is consistent with Regulation 10 which allows the Regional Council to grant approval to any permit holder to measure flows *"as near as practicable to the location from which water is taken under the permit*".

3.7 Stormwater management and monitoring

[057] During the remaining operational life of the GIL, stormwater potentially contaminated with waste material will be directed to the leachate system so that it can be captured and treated at the GIWWTP. Once the landfill is closed and capped, all runoff will be directed to the sediment ponds prior to discharge to the Kaikorai Stream. It was common ground that the landfill management approach was well designed and implemented and the pending landfill closure would further reduce the risk of adverse effects on water quality arising from stormwater runoff.

[058] Mr Elliot suggested that stormwater runoff from the intermediate cap (300mm of compacted cover soils) should be directed to the leachate system. Ms Woods considered that the risk of contamination from the intermediate cap was limited to entrained sediment, so the resultant stormwater runoff could be directed to the sedimentation ponds. I find that to be reasonable.

[059] The Northern Leachate Pond receives stormwater runoff that may have been contaminated with waste material. Flow from that pond is directed to the leachate system. In large rainfall events this pond overtops and flows into the Kaikorai Stream. Ms Woods considered[49] that the concentration of any contaminants in that overflow were expected to be very low and would likely coincide with increased flows in the Stream. She did not see any benefit in additional assessments of the potential frequency of pond overflows and associated effects on the Stream. In light of the lack of discernible effects of leachate on the Stream to date, I find Ms Woods approach to be reasonable.

[060] Mr Elliot suggested that the water level in the Northern Leachate Pond should be managed to reduce the likelihood of overflow in large events. Ms Woods advised[50] that the pond level was managed with a floating decant system which was connected to the leachate system. In between rainfall events, the pond continued to drain down to a low level thereby restoring its capacity and so further active management was unnecessary in her view. In that case I see no harm in retaining Discharge Permit RM23.185.05 Condition 9 as was recommended by Ms McDonald.

3.8 Discharges to air

[061] Potential discharges to air arising from the GIL include odour, dust, landfill gas (**LFG**), and combustion emissions from the LFG engine and flare. I understand that dust emissions are not in contention.

[062] Submitter Colin Venables was concerned about odour from the existing landfill operation. He stated that he and his family had been subjected to offensive landfill odours on numerous occasions in the past, although the frequency of those odours had recently abated. Conversely, submitter Colin Weatherall said he was happy with DCC's odour control practices and considered the GIL was being well-managed.

[063] Peer reviewer Tracey Freeman stated that even with best practice management measures it was not possible to eliminate odours at any landfill. Peter Stacey considered[51] that while some odour may be

[47] Paragraph 17.
[48] Paragraph 21.
[49] EIC Woods, paragraph 34.
[50] EIC Woods, paragraph 36.
[51] EIC Stacey, paragraphs 17 and 27.

noticed at times, it was likely to be infrequent and at a lower intensity (not resulting in offensive or objectionable effects beyond the site boundary) than historical levels due to improved waste acceptance controls, improved landfill gas collection infrastructure, leachate management, and stricter controls on the disposal of highly odorous waste including liming WWTP sludge.

[064] For completeness, in light of the concerns of Mr Venables, I note that Ms Freeman recommended:

- field odour monitoring and adaptive management of on-site operations and mitigation measures in response to monitoring outcomes, using the same wording accepted by DCC for the RRPP consents; and
- annual independent review of odour management, monitoring and complaints to ensure that the landfill operated with as little emission of odour as possible.

[065] Mr Stacey did not oppose those recommendations and consent conditions have been imposed accordingly.

[066] There was disagreement regarding the wording of Condition 4 of Discharge Permit RM23.185.06 (the air discharge consent). Ms Freeman and Mr Stacey commented on what they considered to be appropriate wording and I have had regard to their advice when finalising the wording of that condition and its associated advice note. I generally preferred Ms Freeman's wording for the condition.

[067] Mr Elliot recommended 1,000 ppm as a trigger level for surface methane emissions from the final landfill cap. He suggested that where that trigger level was exceeded, remedial works should be undertaken to prevent emissions at the respective location, and the area re-monitored to confirm that the remedial works were successful[52]. Simmone Eldridge[53] did not support the 1,000 ppm trigger level as the 5,000 ppm value sought by DCC was consistent with Clause 26(2(a) of the NES Air Quality and was used for similar air discharge consents in NZ. On that basis I am satisfied that a level of 5,000 ppm is appropriate and there is no need to specify a lower trigger level.

[068] Ms Eldridge advised that specific remedial works to be undertaken if the trigger level for surface methane emissions was exceeded were documented in section 3.5.10.5.7 of the 2018 LMP. I find that to be appropriate as those measures may be refined over time and so including them in the LMP provides flexibility over the life of the consents.

[069] Ms Eldridge proposed alternative and more specific LFG monitoring methodology[54] compared to Mr Elliot's approach of referring to Australian Landfill Gas Fugitive Emissions Monitoring Guidelines. I prefer the specificity and certainty of wording provided by Ms Eldridge.

3.9 Landfill gas management

[070] Ms Eldridge advised that a new enclosed gas flare became operational at the site in January 2025. With the new flare[55] in place, the flare and gas engine system had a combined maximum capacity of approximately 1,350 m^3/hr compared to the modelled maximum landfill gas generation for the site of 722 to 819 m^3/hr depending on the management of leachate levels. On that basis I am satisfied that the LFG management system now has sufficient capacity to destroy all LFG captured from the landfill.

[071] Ms Eldridge noted that a Landfill Gas Risk Assessment (**LFGRA**) was prepared in response to a Section 92 request from Mr Elliot. In my precirculated questions I queried the merits of updating the LFGRA in three years' time (as had been recommended by Mr Elliot).

[072] Ms Eldridge considered there was no need for the LFGRA to be updated, because the current LFGRA had identified a negligible to low risk, the lateral extent of the waste was not changing, the landfill gas extraction system would continue to operate, and the monitoring wells would continue to be monitored and would

[52] EIC Elliot, paragraphs 65 and 66.
[53] EIC Eldridge, paragraph 22.
[54] EIC Eldridge, paragraph 23.
[55] The old flare is being retained onsite as a backup.

provide evidence of any change to the risk profile. I agree and so I have omitted a requirement to update the LFGRA. In that regard, at the Hearing Ms Freeman stated she was "*not unhappy with the conclusions of the LFGRA*", which in my mind negates the need for it to be updated.

[073] Mr Dale recommended that the additional LFG wells shown on drawing 12547621-C501 need only be installed no later than 2 years following the final acceptance of waste at the landfill. Ms McDonald had recommended a six-month period. The evidence is that the potential adverse effects of fugitive LFG emissions are not significant. However, I consider a two-year period is overly generous and so I have opted for a compromise 12-month post-closure timeframe.

[074] Ms Freeman recommended monitoring biogas hydrogen sulphide composition and gas flow rates at the engine and flare. Mr Stacey remodelled emissions from the LFG combustion equipment (engine and flare) and the GIWWTP boiler which showed that off-site SO_2 concentrations[56] were below the relevant air quality assessment criteria. He nevertheless agreed with the additional monitoring recommended by Ms Freeman, but considered that monitoring should occur weekly and not continuously. At the Hearing Ms Freeman agreed with weekly monitoring and I find that to be appropriate.

3.10 Landfill fire risk

[075] Mr Elliot recommended a landfill fire risk assessment be undertaken and he expressed concern about battery fires and their management, a review of the FMP, gas monitoring, infrared monitoring, chemical fires and odour monitoring for fires. Anthony Dixon advised that a Fire Management Plan (**FMP**) was prepared in March 2023[57] as an appendix to the GHD Design Report and an addendum to the FMP was prepared[58] and provided to ORC in October 2024 that included a landfill fire risk assessment .

[076] Mr Dixon advised the matters of concern to Mr Elliot had been addressed in the FMP. He elaborated on them in his evidence[59] and I found his responses to be adequate and see no need for conditions to specify further actions or require refinement of the FMP, noting Mr Dixon's agreement that thermal imaging monitoring records should be included in the Annual Monitoring Report required under General Condition 59.

[077] On the basis of Mr Dixon's evidence, I see no need for a further Landfill Fire Risk Assessment.

[078] For completeness I note Mr Dixon advised[60] that feedback from FENZ during a site inspection meeting on 14 February 2025 indicated that they were generally satisfied with the proposed approach to fire management at the site.

3.11 Human Health Risk Assessment

[079] Dr Dodd discussed the May 2024 Human Health and Ecological Risk Assessment (**HHERA**) undertaken for discharges from the landfill into the Kaikorai Stream. The HHERA concluded that an impact of the landfill on water quality within Kaikorai Stream was not readily discernible in the available 2017 to 2023 water quality dataset[61]. However, Dr Dodd noted that elevated concentrations of nitrate, zinc, and PFAS were found both upstream and downstream of the landfill.

[080] In my questions to the DCC experts and the ORC peer reviewers I queried the merits of updating (or reviewing or revising) the interim HHERA in 3 years' time. From their helpful responses I understand that:

- the monitoring parameter dataset available for the stream and estuary to support the preparation of the HHERA did not align with the minimum requirements outlined in the ANZG framework;

[56] Using the highest mass flow of H_2S to the boiler from the recent six months of data to calculate SO2 emissions.
[57] Elements of it will be included in the Green Island Landfill Development and Management Plan.
[58] In response to a s92 request.
[59] EIC Dixon, Table 1.
[60] EIC Dixon, paragraph 20.
[61] EIC Dodd, paragraph 14.

- there are gaps in the down-gradient groundwater monitoring well coverage. That will be addressed by the additional monitoring well cluster to be located at the southwestern edge of the GIL along with well BH103;
- an updated HHERA, supported by a more robust stream and estuarine water quality dataset, will enable a better understanding of the GIL's contribution to contaminant loads in the receiving environment, and consequently a more robust characterisation of the risks to human health and aquatic ecology associated with GIL discharges; and
- an updated HHERA will also support a rationalisation of the ongoing groundwater and/or surface water monitoring program (namely the range of parameters and locations may be reduced if their risk is determined to be low).

[081] I also note the evidence of submitters Colin Weatherall and Fish and Game that recreational angling and duck shooting occur in the stream and estuary and that the stream supports a viable sports fish population. Human consumption of the fauna is currently occurring.

[082] Consequently, I have no issue with imposing a consent condition requiring the May 2024 HHERA to be reviewed and updated in three years' time.

[083] For submitter Fish and Game, Nigel Paragreen suggested that the updated HHERA should also address contamination issues at the catchment scale. However, that is not the applicant's responsibility and so I do not consider that the consent conditions should require a 'catchment scale' HHERA. However, I agree with Tanya Blakely's advice[62] that *"A catchment-wide study over and above the updated HHERA, led by ORC or others and using the approaches outlined in the ANZG framework, would be an effective way to understand the condition of the broader catchment. The HHERA could inform such a catchment-wide study."*

3.12 Landscape

[084] While there are no issues of contention relating to landscape matters, I note Ms McManaway's advice that the purpose of the proposed Vegetation Management and Restoration Plan (**VMRP**), which must be prepared within six months of the commencement of consent, is to develop and set out the detailed programme of works and no planting work is proposed to occur prior to the VMRP's completion. I have no issue with that.

3.13 Community Liaison Group

[085] DCC initially proposed the establishment of a Community Liaison Group (**CLG**). In my precirculated questions I queried the merits of a CLG in light of there being only two 'lay person' submissions, neither of which were in opposition. In Reply Mr Garbett advised that the DCC's existing practice of 'one on one' liaison with concerned residents was effective and would be continued. On that basis DCC withdrew their offer to form a CLG and I find that to be acceptable.

3.14 Nesting Birds

[086] In her speaking notes for the Hearing Ms Morrison recommended a greatly expanded condition that addressed the avoidance of adverse effects on nesting native birds if and when existing trees on the GIL landscape bund and site boundary were removed. She advised that was based on similar conditions imposed in the Auckland region.

[087] At the Hearing Mr Garbett advised that DCC accepted the 'sentiment'' of that condition but considered it could be refined. The Reply submissions stated DCC preferred Ms Blakely's version to make it clear that exotic tree felling can occur outside the nesting period without the rigour that the condition proposed by Ms Morrison requires. I find that to be a preferrable approach.

[62] DCC's answers to Minute 3 questions.

3.15 The need for a bond

[088] In my experience bonds are commonly imposed on landfill resource consents throughout New Zealand, albeit in different forms. It is the applicant's current intent to own the GIL site and remain as its consent holder. However, it is also possible that the DCC may one day decide to sell the land and the landfill operation to a private company, as has occurred in other parts of New Zealand.

[089] Ms McDonald recommended that a bond should to be executed if the landfill was privatised. However, her recommended bond condition referred to an 'Attachment C' which was devoid of content. Mr Dale provided a copy of a 1994 bond agreement relating to the GIL. That 1994 bond agreement was reviewed by ORC's legal advisors who identified some deficiencies with it. In response Mr Garbett proposed some amendments to it as part of his opening submissions and a revised bond agreement was attached to the Reply submissions.

[090] I have inserted a placeholder in General Conditions Attachment B requiring that 2025 signed Bond agreement to be inserted into the conditions.

4.0 Statutory Instruments

[091] Ms McDonald helpfully listed the relevant statutory instruments:

- National Policy Statement for Freshwater Management 2020
- New Zealand Coastal Policy Statement 2010
- National Policy Statement for Indigenous Biodiversity 2023
- Resource Management (National Environmental Standards for Sources of Human Drinking Water) Regulations 2007
- Resource Management (Measuring and Reporting of Water Takes) Regulations 2010 and Amendment Regulations 2020
- Resource Management (National Environmental Standards for Freshwater) Regulations 2020
- Resource Management (National Environmental Standards for Air Quality) Regulations 2004
- Operative Otago Regional Policy Statement
- Proposed Otago Regional Policy Statement
- Regional Plan: Water for Otago
- Regional Plan: Waste for Otago
- Regional Plan: Air for Otago

[092] Appendix B of the Section 42A Report provided a comprehensive, 81-page long assessment of the applications against the relevant provisions of those instruments. In Table 3 of her Section 42A Report Ms McDonald provided a concise summary of the key findings of that assessment for the relevant provisions of the NZCPS, NPS-FM, NPIS-IB, ORPS 2019, P-ORPS 2021, RP:Water, RP:Waste, RP:Air, and the Kāi Tahu ki Otago Natural Resource Management Plan 2005. Ms McDonald considered that the proposal was consistent or partially consistent (while becoming increasingly consistent over time) with the instrument's provisions, and any inconsistencies would only arise over the short term.

[093] Mr Dale considered[63] that applications were largely consistent with the overall policy direction of the relevant planning documents (particularly the higher order, contemporary, and settled directions of the NPS-FW, NPS-IB, NZCPS, ORPS, and P-ORPS) and were not contrary to any provisions of those instruments.

[094] Having read the assessments of statutory instruments outlined above, I am satisfied that the applications are generally consistent with the relevant provisions of those instruments, and any areas of inconsistency will diminish over time following the closure of the landfill. On that basis I find that having regard to the statutory instruments does not weigh against a grant of consent. However, the assessment of those instruments has assisted in ensuring that the consent conditions are robust and fit for purpose.

[63] EIC Dale, paragraph 15.

5.0 Section 104(1)(c) other matters

[095] Mr Dale considered[64] appropriate regard had been given to s104(1)(c) RMA 'other matters' including alternative sites and methods. I agree, particularly in light of Mr Henderson's evidence[65] about DCC's evaluation of options for waste disposal prior to the Smooth Hill landfill being able to accept waste.

[096] In light of Te Rūnanga o Ōtakou advice outlined in section 2.2 of this Decision, I am satisfied that appropriate regard has been given to the Kāi Tahu ki Otago Natural Resources Management Plan 2005.

[097] No other matters were brought to my attention.

6.0 Section 105(1) matters

[098] Section 105(1) of the RMA states that where an application is for a discharge permit to do something that would otherwise contravene Section 15 or Section 15B of the Act we must have regard to certain matters, namely:

a) the nature of the discharge and the sensitivity of the receiving environment to adverse effects;

b) the applicant's reasons for the proposed choice; and

c) any possible alternative methods of discharge, including discharge into any other receiving environment.

[099] In this case the receiving environment is relatively sensitive, comprising as it does the Kaikorai Stream, the estuary, shallow groundwater below the landfill footprint, and adjacent residential areas with respect to discharges to air. However, the evidence is that the discharges from the landfill are having little, if any, discernible adverse effects on the aquatic receiving environment. Despite public notification, only one submitter expressed concerns about odour. The reason for the applicant's choice of the receiving environment is that the GIL has existed in its current location since 1954 and the site is designated for landfill purposes. There are no other practical methods of discharge or other receiving environments.

[100] I find that a consideration of s105(1) matters does not weigh against a grant of consent.

7.0 Section 107(1) matters

[101] Section 107(1) of the RMA states that a discharge permit shall not be granted if, after reasonable mixing, the contaminant or water discharged is likely to give rise to certain listed effects. I am satisfied on the evidence that the GIL discharges will not produce the effects listed in ss107(1)(c) to (g).

[102] Section107(2A) states:

> A consent authority may grant a discharge permit or a coastal permit to do something that would otherwise contravene section 15 or 15A that may allow the effects described in subsection (1)(g) if the consent authority—
>
> (a) is satisfied that, at the time of granting, there are already effects described in subsection (1)(g) in the receiving waters; and
>
> (b) imposes conditions on the permit; and
>
> (c) is satisfied that those conditions will contribute to a reduction of the effects described in subsection (1)(g) over the duration of the permit.

[103] Consequently, even if I am wrong about the effects of the GIL discharges on aquatic life, I record that the discharge of the GIL leachate and stormwater to water (or to land where those discharges may enter water) satisfies the criteria listed in s107(2A) and so the consents can be granted.

[104] I find that a consideration of s107(1) matters does not weigh against a grant of consent.

[64] EIC Dale, paragraph 16.
[65] EIC Henderson, paragraphs 16 to 25.

8.0 Part 2 matters

[105] I find that recourse to Part 2 matters would not add anything to the assessments that I have outlined in preceding sections of this Decision. Having said that, I note that Ms McDonald[66] and Mr Dale[67] both undertook an assessment of Part 2 matters and concluded that the proposal will achieve the purpose and principles of Part 2. I concur with those assessments.

9.0 Consent duration

[106] The applicant sought a term of 35 years for all consents other than the water permit to take groundwater, for which a 6-year consent term was sought in line with the policy direction in Chapter 10A of the RP:Water as (introduced by Plan Change 7). Ms McDonald considered those durations to be appropriate[68] and Mr Dale[69] agreed with her. I agree that the durations sought are appropriate for a regionally significant infrastructure project such as the GIL.

10.0 Consent conditions

[107] Ms McDonald provided a comprehensive suite of conditions that was based on the conditions recommended by DCC, amended by her to incorporate the recommendations of the ORC technical peer review experts. Mr Dale commented on those conditions, referring to the advice of the DCC experts, and in his evidence he included a further series of amendments[70] including the rationale for them[71]. I generally have no issue with amendments recommended by Ms McDonald that were accepted by Mr Dale.

[108] A further revised suite of consent conditions was provided as part of the Reply submissions, indicating areas of agreement and disagreement between the DCC experts and the ORC's expert peer reviewers.

[109] The consent conditions I have settled on are included in Appendix 1 to this Decision.

[110] I have made numerous minor amendments to the recommended conditions, including:

- Replacing "shall" with "must";
- Using the term "written certification" instead of "certification";
- Referring to the 'commencement of consent' instead of the 'issue or issuing of consent' or 'grant or granting of consent';
- Referring to the Otago Regional Council instead of "Consent Authority"; and
- Correcting grammar and cross-references.

[111] Additionally, on areas of disagreement not already covered in preceding section of this Decision my findings are (unless stated otherwise the condition numbers refer to the conditions in Attachment 1 of this Decision):

General Conditions

- I do not find it appropriate to enable the extended section of the leachate infiltration trench to be designed in the absence of ORC certification and so I have retained General Condition 4(g) as recommended by Ms McDonald;
- As discussed in section 3.2 of this Decision, I am satisfied that a final cap grade of 4% is adequate, as it is likely to still provide a sufficient slope that will avoid stormwater ponding on the capped landfill. I have therefore accepted Mr Dale's amendment to General Condition 31;
- There was agreement that the DCC should prepare an Adaptive Management Plan to deal with "*any adverse effects on water quality directly attributable to landfill leachate from the landfill entering the Kaikorai Stream*". I am generally satisfied with Mr Dale's amendments to General

[66] Section 42A Report, section 11 titled "Part 2 of the RMA".
[67] EIC Dale, paragraphs 113 to 117.
[68] ORC Section 42A Report, section 14.
[69] EIC Dale, paragraph 123.
[70] EIC Dale, Attachment 1.
[71] EIC Dale, paragraph 121.

Condition 51 (including the listing of possible mitigation actions) and agree that conditions should require the AMP to be certified by ORC and implemented by DCC (General Conditions 52 and 53).

A: Discharge Permit RM23.185.01

- In section 3.4 of this Decision, I found that the leachate pipe rather than the leachate trench should be designed with resilience to a ULS seismic event. However, given the importance of the leachate trench I find it must be designed by a suitably qualified person and the design should be subject to ORC certification. I have therefore not omitted clauses (a) and (c) from Condition 5 that was recommended by Ms McDonald[72].

B: Water Permit RM23.185.02

- I agree with Mr Dale that there is no need to specify an instantaneous allowable rate of take in Condition 3 for groundwater pumped out of the infiltration trench. Daily flow limits are sufficient.

D. Water Permit RM23.185.03

- I have simplified Condition 3 relating to the remedial works on the culvert linking the southeastern and eastern constructed wetlands.

F: Discharge Permit RM23.185.05

- In section 3.7 of this Decision I agreed that stormwater emanating from the intermediate cap could be directed to the stormwater treatments ponds. I have clarified Condition 10 accordingly.

G: Discharge Permit RM23.185.06

- There is no need for a condition requiring a new gas flare as it has already been installed; and
- As discussed in section 3.8 of this Decision, I prefer the more specific methane gas monitoring methodology recommended by Ms Eldridge and so I have amended Condition 29 as recommended by her and Mr Dale. I have retained the methane limit in Condition 26 at 5,000 ppm. That being the case, I see no need to require methane emissions between 500 and 1000 pm to be investigated, as was recommended by Mr Elliot.

[112] I understand that:

- The conditions attached to this Decision are not in the final format used by ORC; and
- ORC will issue a standalone consent document for each resource consent in the standard ORC format.

[113] The final conditions are voluminous. Consequently, despite the diligent efforts of Ms McDonald, Mr Dale and myself, it is conceivable that they may contain errors.

[114] Accordingly, should the DCC or the ORC identify any minor mistakes or defects in the attached conditions (particularly in terms of the monitoring parameters for which trigger levels are to be established), I am prepared to issue an amended schedule of conditions under s133A of the RMA correcting any such matters. Consequently, any minor mistakes or defects in the amended conditions should be brought to my attention prior to the end of the 20-working day period specified in section 133A of the RMA.

11.0 Determination

[115] I grant the resource consents sought by the Dunedin City Council for the for the ongoing use, extension, closure, and aftercare of the Green Island Landfill.

[116] My reasons are detailed in the body of this Decision, but in summary they include:

[72] Her clause (c) is now clause (b).

- Potential adverse effects of the proposal are either minor; minimised to the extent practicable, or are otherwise suitably avoided, remedied, mitigated or offset by the imposition of appropriate conditions of consent (including comprehensive monitoring and adaptive mitigation of unforeseen adverse effects should they arise); and
- The proposal is generally consistent with the relevant statutory instruments and any inconsistencies are minor and do not weigh against a grant of consent.

Rob van Voorthuysen
9 April 2025