

Cultural Impact Assessment Fairfield Landfill Aftercare



Mō tātou, ā, mō kā uri a muri ake nei.
For us, and for our children after us.

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Front cover photo: View from the Fairfield Landfill across the Kaikarae Estuary, 25th August 2023.
Source: Aukaha.

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	Report 1 of 1 Tartan Industries Ltd / Waste Management NZ Limited

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Toitū te Mana, Toitū te Whenua: Te Rūnanga o Ōtākou



Whakaahua 1: Ōtākou Marae, showing the Wharenui, Tamatea, and Wharekai, Hakuiao²

Our people are descended from Waitaha, Kāti Māmoe and Kāi Tahu. Waitaha is used to collectively describe all the ancient indigenous groups who lived in Te Waipounamu prior to the migrations of Kāti Māmoe from Heretaunga in the early 17th century, and the later migration of Kāi Tahu. By the time Kāi Tahu arrived, Kāti Māmoe, through a combination of inter-marriage and conquest, had largely merged with the resident hapū of Waitaha. Again, through warfare and intermarriage, Kāi Tahu merged with the resident Waitaha and Kāti Māmoe peoples.

When we refer to ourselves as Kāi Tahu or Kāi Tahu Whānui, we also refer inclusively to our Waitaha and Kāti Māmoe whakapapa.

Our hapū affiliations at Ōtākou come out of Te Ruahikihiki whakapapa, with the principal hapū being Kāi Taoka and Moki II. Kāi Te Pahi, an Ōtākou-specific hapū, also has special significance within our takiwā.

The coastal takiwā of Te Rūnanga o Ōtākou centres on Ōtākou Marae on the Otago Peninsula and extends from Purehurehu to Te Mata-au. The hapū of Te Rūnanga o Ōtākou are mana whenua for the Kaikarae Estuary and surrounds, including the Fairfield Landfill site.

² Image credit: Connagh Wesley, Whakaahua Studios, 2023.



Whakaahua 2: Ngāi Tahu Treaty Festival 2023, Ōtākou Marae³

³ Image credit: Connagh Wesley, Whakaahua Studios, 2023.

1.0 He Reo Arataki: Introduction

1.1 Background

Tartan Industries Limited (**TIL**), a subsidiary of Waste Management NZ Limited (**Waste Management**), own the site associated with the Fairfield landfill (**the landfill**, or **the site**).

The landfill is now closed and is therefore no longer receiving any waste material for disposal.⁴

In August 2022, Waste Management completed the final phases of site engineering to meet the closure requirements for the landfill. These requirements are specified in the discharge permit granted by the Otago Regional Council (**ORC**) that authorised the discharge of waste material at the landfill, and the Closure Management Plan prepared in accordance with the discharge permit. Key closure activities included landfill capping and revegetation of the site, as well as the installation of the landfill gas flares.

While the landfill is now closed, activities currently authorised by the regional resource consents will continue during the landfill's aftercare period as the material in the landfill continues to slowly decompose. The regional resource consents granted by the ORC expired in September 2024.

1.2 Fairfield Closed Landfill Site Location and Infrastructure

The closed landfill is in the suburb of Fairfield. The site lies to the south of Walton Park, an area of residential development on the southern side of State Highway 1 (SH1), and to the east of the Walton Park Recreational Reserve. Kaikarae Stream⁵ is located to the east of the landfill, with the northern extent of the Kaikarae Estuary adjoining the landfill site's southern boundary.

The landfill boundary is located approximately 3 km inland from the ocean mouth of the Kaikarae Estuary. The location of the landfill is shown in Whakaahua 3.

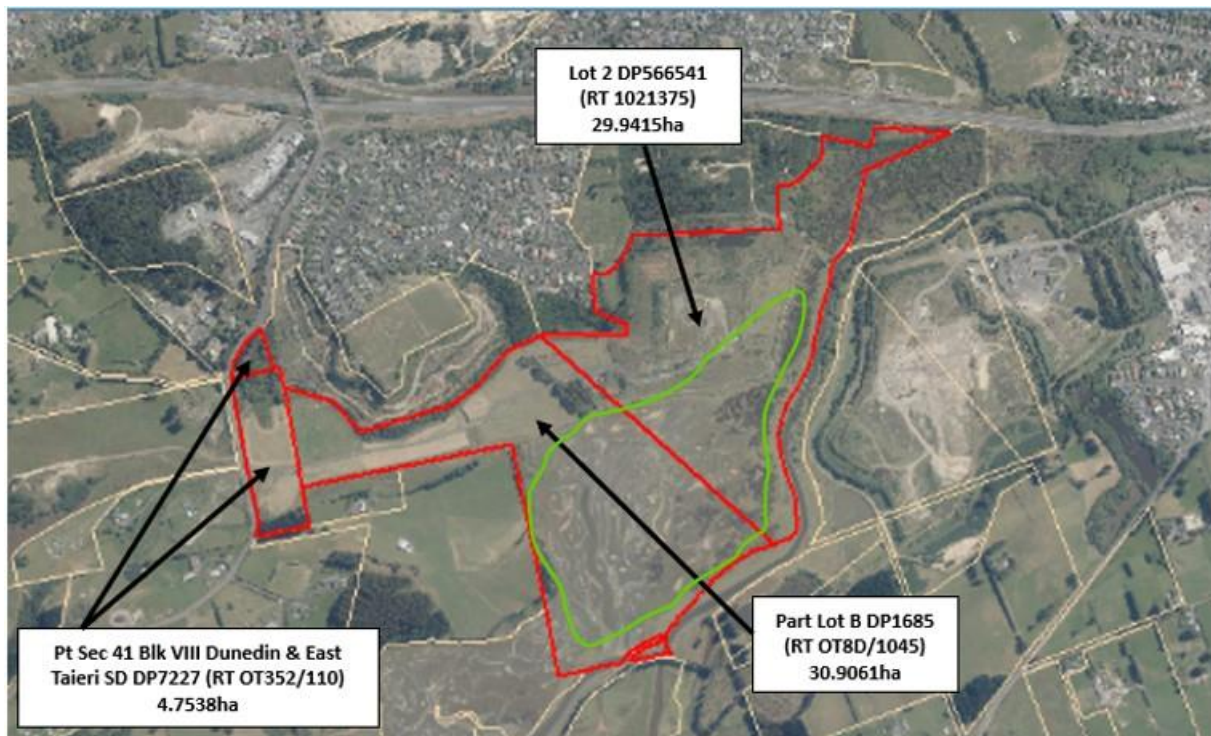
⁴ Waste disposal completely ceased in July 2017.

⁵ It is acknowledged that some, but not all, online maps label the part of the stream that flows past the landfill as 'Abbotts Creek'. A review of the NZTopo50 maps labels Abbotts Creek as being associated with the creek that flows into the Kaikarae Stream just south of State Highway One. Throughout this application, the part of the stream that flows past the landfill will be referred to as Kaikarae Stream.

The site is approximately 65.6 ha in area. The land parcels associated with this site, as shown in Whakaahua 4, are:

- Lot 2 DP566541 (RT 1021375), which includes part of the Kaikarae Lagoon Swamp Wetland;⁷
- Part Lot B DP1685 (RT OT8D/1045), which also includes part of the Kaikarae Lagoon Swamp Wetland; and
- Part Section 41 Block VIII Dunedin & East Taieri Survey District and DP7227 (RT OT352/110).

The Eastern Landfill is located solely in Lot 2 DP566541, while the eastern end of the Western Landfill is in Lot 2 DP566541, and its western end is in Part Lot B DP1685.⁸ A further boundary adjustment is proposed with a neighbouring site to bring the northern stormwater pond and associated infrastructure within the landfill site.



Whakaahua 4: Fairfield Closed Landfill – Land Parcels (Source: Prover.co.nz)

Access to the site is from Old Brighton Road, via an approximately 1km long access road. A locked gate at the site entrance restricts unauthorised access.

A landfill leachate interception drain runs along the southern and eastern boundary of the Western and Eastern Landfills, with stormwater treatment ponds located on the northern and western side of the Eastern Landfill. This system was installed to intercept shallow groundwater and leachate as it migrates outwards from the Eastern and Western Landfill areas. The interception drain is a condition of consent for the management of the landfill, which requires a depression in the groundwater level to prevent the outward flow of leachate and associated groundwater from the landfill.⁹ The

⁷ Prior to subdivision, which was completed in March 2023, Lot 1 DP566541 (RT 1021374) and Lot 2 DP566541 (RT 1021375) were contained in Part Lot C DP1685 (RT OT13B/390).

⁸ The eastern end of the Historical Landfill is located within Part Lot B DP1685, with the remainder of the Historical Landfill contained in Part Section 41 Block VII Dunedin & East Taieri Survey District and DP7227.

⁹Consent 93540, Condition 4

interception drain is a critical piece of site infrastructure that mitigates the effects on the environment from any ongoing leachate being generated by the closed landfill.



Whakaahua 5: Leachate interception drain and drainage layout (Source: Pattle Delamore Partners, 2023)

The high-level estimates indicate that between 95.4 % and 99.4 % of the leachate generated by the landfill is intercepted by the drain.¹⁰ The resulting 0.6 % – 4.6 % of leachate that is not intercepted by the drain appears to be contributing to contaminant levels that are higher than the NPS-FM 2024 bottom line for species protection.¹¹ The groundwater report states that ‘the location (where) groundwater emerges as surface water in the wetland-estuary complex is unknown and with the lack of monitoring data, the effects cannot be determined with any accuracy.’¹²

Landscaping, established in accordance with resource consent conditions while the landfill was operating has been established between the landfill and the existing residential area associated with Walton Park. The site is covered in pastoral grasses and is generally flat except for the Eastern Landfill.

1.3 Historical Resource Consents

The ‘Fairfield Closed Landfill – Closure Management Plan’¹³ provides the following history of landfilling activities at the site:

- 1967: Landfill operations commenced off Old Brighton Road.
- 1960s to 1980s: Landfilling activities moved progressively eastwards.

¹⁰ Pattle Delamore Partners (2023) Fairfield Landfill – Technical Assessment of Effects on Groundwater, Surface Water and Ecology, p.46

¹¹ Refer to Appendix 4: Summary of Contaminant Concentrations, prepared by Aukaha Ltd (2024).

¹² Pattle Delamore Partners (2023) Fairfield Landfill – Technical Assessment of Effects on Groundwater, Surface Water and Ecology, p.62.

¹³ August 2019

- 1996: The Western Landfill closed, and the Eastern Landfill opened.
- 2017: The Eastern Landfill stopped accepting solid waste.

The two older landfills are referred to as the 'Historic Landfill' (the area closest to Old Brighton Road) and the 'Western Landfill' (the middle landfill). In August 2022, Waste Management completed the closure process for the 'Eastern Landfill'.

The partitioning of the Western and Eastern Landfills is shown by Whakaahua 6.



Whakaahua 6: Approximate extent of the western and eastern landfills (white shading). Site boundary in red (Source: Tonkin & Taylor 2024, Figure 2.1).

The regional resource consents which authorised the development and subsequent operation of the Eastern Landfill, as well as the ongoing discharges from the Western Landfill, were issued in 1995/1996.¹⁴ A discharge permit to provide for the progressive closure of the Eastern Landfill was sought in 2018, prior to the expiry of the previous discharge permit¹⁵ which authorised the discharge of waste as well as closure activities.

¹⁴ While Consents 93540 to 93442 were issued in 1995, the application for these resource consents was lodged with the ORC in 1993.

¹⁵ Consent 95007 which expired on 1 September 2018.

The ORC consents issued for the landfilling activities were:

- A discharge permit to discharge a mixed stream of domestic, commercial, and industrial waste and clean fill to land at the Eastern landfill.¹⁶ This consent limited the rate of discharge to 1,800 m³ per week of compacted waste and prohibited the discharge of hazardous substances. Waste disposal activity ceased in 2017.
- A discharge permit to authorise the discharge of clean fill and capping material to land for the purpose of landfill closure.¹⁷
- A discharge permit to discharge landfill gas, odour, and dust to air.¹⁸
- A discharge permit to discharge landfill leachate to groundwater by seepage from the base of the landfill.¹⁹
- A water permit to take underground water containing leachate and other groundwater to control landfill leachate and maintain groundwater within the landfill area at a lower level than the surrounding land.²⁰ Leachate (and associated groundwater) from the landfill is collected by a gravity fed leachate interception drain located at 'toe' of the landfill. The drain runs along the eastern and southern sides of the Eastern and Western Landfills, as shown by Whakaahua 5. The landfill leachate and groundwater collected in accordance with this water permit is discharged into the Dunedin's wastewater network in accordance with a Trade Waste Consent.
- A discharge permit to discharge up to 3,400m³ per day of stormwater runoff from the non-working areas of the landfill into the Kaikarae Stream²¹ after treatment through silt retention ponds.²²

These resource consents have expired. In accordance with section 124 of the RMA, as the application for replacement regional consents was lodged more than six months prior to the expiry of the existing consents, Waste Management can continue aftercare activities on the site, in accordance with the above resource consents, while the current resource consent application is in progress.

1.4 Proposed Regional Resource Consents

While the landfill is now closed and no longer receiving waste material, the other activities authorised by the previous regional consents will continue during the aftercare period as the material in the landfill continues to slowly decompose. Specifically, leachate and gas will continue to be generated as the waste in the Western and Eastern Landfills continues to decompose, although over time the leachate and gas levels will reduce, and ultimately cease once the organic material has completely decomposed. It is also anticipated that stormwater from the landfill, albeit from vegetated surfaces, will continue to be periodically discharged to the Kaikarae Stream / Kaikarae Lagoon Swamp after retention in the North and Weighbridge Ponds.

¹⁶ Consent 95007

¹⁷ Consent RM18.066.01

¹⁸ Consent 95008

¹⁹ Consent 93540

²⁰ Consent 93541

²¹ The site directly discharges stormwater from the North Pond to the Kaikarae Stream, and overflows from the Weighbridge Pond into the Kaikarae Swamp Lagoon. While Consent 93542 only refers to the Kaikarae Stream, the consent does authorise stormwater discharges from the site ponds. It has been assumed that the reference to Kaikarae Stream in this consent effectively includes the Kaikarae Swamp Lagoon.

²² Consent 93542

Waste Management are seeking new regional resource consents for the aftercare period of the closed Western and Eastern Landfills. The activities for which resource consents are sought are:

- A discharge permit for the discharge of landfill gas and associated odour to air. This discharge was previously authorised by Consent 95008. The discharge of dust is also authorised by Consent 95008, but as the landfill is now closed this aspect of the discharge will no longer occur at the site.
- A discharge permit for the discharge of landfill leachate to groundwater by seepage through the 21-hectare base of the closed landfill, which is bounded by a leachate interception drain. This discharge was previously authorised by Consent 93540
- A water permit to take groundwater containing leachate and other groundwater for the purpose of controlling landfill leachate. This take was previously authorised by Consent 93541. The leachate and groundwater taken in accordance with this water permit is discharged into Dunedin's wastewater network in accordance with a trade waste consent.
- A discharge permit to discharge stormwater runoff into the Kaikarae Stream and the Kaikarae Lagoon Swamp, after treatment through the North and Weighbridge stormwater retention ponds. This discharge was previously authorised by Consent 93542. Stormwater from the North Pond is discharged into the Kaikarae Stream, and the overflow discharge from the Weighbridge Pond is discharged into the Kaikarae Lagoon Swamp.

Finally, as the site adjoins a Regionally Significant Wetland, resource consents for the discharges and the take, within 100m of a natural wetland, were also sought under the National Environmental Standards for Freshwater.

2.0 Ecological Context: Kaikarae Lagoon Wetland, Estuary and Tributaries

The waterbodies potentially impacted by seepage from the landfill include:

- Kaikarae Lagoon Swamp Wetland: The wetland (swamp marsh) that extends from just north-east of the Fairfield Landfill, to immediately below the landfill (above the coastal marine area boundary). The Kaikarae Lagoon Swamp is classified as a Regionally Significant Wetland under the Regional Plan Water for Otago (Schedule 9 – Wetland 68, Map F57).²³
- Kaikarae Lagoon Estuary: The estuary region in the coastal marine area, downstream of the wetland swamp
- Kaikarae Stream: The waterway flowing alongside the eastern edge of Fairfield landfill, below the Kaikarae Stream/Abbotts Creek confluence.
- Christies Creek: The creek flowing along the northern edge of the Western Landfill area prior to entering the Kaikarae Lagoon.
- Coal Creek: The creek that runs along the southern boundary of the site.
- Coal/Christies Creek confluence: The waterway immediately below the confluence of Coal and Christies Creek prior to entering the Kaikarae Lagoon.

Pattle Delamore Partners (2023) has assessed the ecological values of Kaikarae Stream and tributaries, Kaikarae Swamp Wetland, and Kaikarae Estuary as shown in Tūtohi 1 - 3:

Tūtohi 1: Kaikorai Stream and Tributaries Aquatic Ecological Valuation

Matter	Attributes	Value
Representativeness	• The Kaikorai catchment is highly modified and dominated by pasture (48%) and urbanisation (21%), with low levels of native forest catchment surrounding upper tributary streams only. The lower tributaries (Christies and Coal Creeks) are heavily modified and channelised, with low quality instream habitat conditions. • Surface water quality in the lower tributaries did not represent 'reference' water quality conditions for total ammoniacal nitrogen (TAN), zinc, and boron. • Macroinvertebrate communities in the Upper Kaikorai Stream/Abbotts Creek were indicative of pollution tolerant species, with MCI and QMCI scores below the national bottom line. • Kaikorai Stream/Abbotts Creek has a diverse freshwater fish community (10 taxa), including the nationally vulnerable lamprey. Ecological values of Christies and Coal Creeks are unknown.	Moderate

²³ <https://www.orc.govt.nz/environment/water-care/wetlands-and-estuaries/natural-wetlands/regionally-significant-wetlands/dunedin-district/kaikorai-lagoon-swamp/>

Rarity/ distinctiveness	• ‘Threatened- Nationally vulnerable’ lamprey and the ‘At Risk-Declining’ longfin eel, and declining inanga utilise Abbotts Creek/Kaikorai Stream for habitat, passage, lifecycle and feeding.	High
Diversity and pattern	• There is a high taxonomic richness of native freshwater fish in the Kaikorai Stream but a low diversity of macroinvertebrates. Ecological values of Christies and Coal Creeks are unknown.	Moderate
Ecological Context	• All tributaries have been heavily modified, with poor water quality and loss of naturalness. Abbotts Creek/ Kaikorai Stream is a habitat for nationally rare or threatened species of freshwater fish.	Moderate
Overall Value		High

Tūtohi 2: Kaikorai Swamp Wetland Aquatic Ecological Valuation

Matter	Attributes	Value
Representativeness	• The Kaikorai swamp/wetland has undergone substantial habitat modification, with an estimated 100 ha of saltmarsh modified or lost. Extensive herbfields remain in the wetland, forming a distinctive swamp. Low levels of native forest remain in the catchment, with urbanisation and pasture impacting on tributaries. • Surface water quality in the swamp did not represent ‘reference’ water quality conditions for TAN, zinc, and boron. • New Zealand Freshwater Fish Database (NZFFD) records indicate that native fish communities in the Kaikorai Swamp have low diversity, with only four reported.	Moderate
Rarity/ distinctiveness	• The swamp/wetland is recognised as a wetland of regional significance, as well as having significant conservation values, with only 15% of swamps remaining in Otago. The wetland is a habitat for the threatened Australasian Bittern and the Banded Dotterel.	Very High
Diversity and pattern	• There is a high taxonomic richness of birdlife that utilise the Swamp – Estuary complex and well as herbfields.	High
Ecological Context	• The swamp/wetland is classified as a “Regionally Significant Wetland” under the Regional Plan: Water for Otago and an Area of “Significant Conservation Value” in the DCC 2nd Generation District Plan. It provides habitat for nationally rare or threatened species of birds and fish, and critical habitat for the life cycle of a wide range of birds that are dependent on wetlands.	Very High
Overall Value		Very High

Tūtohi 3: Kaikorai Estuary Aquatic Ecological Valuation

Matter	Attributes	Value
Representativeness	- The Kaikorai Estuary has undergone major habitat modification, with loss of habitat, reduction in terrestrial buffer zones, and causeway construction, resulting in substrate modification. - Water quality arising from the tributaries fails to meet 'reference' conditions for TAN, zinc, and boron. Sediment quality in the estuary did not represent 'reference conditions' for total nitrogen, zinc, and percentage mud. Macrofauna communities in the estuary were moderately to heavily impacted by the percentage mud. - New Zealand Freshwater Fish Database (NZFFD) records indicate that Kaikorai Estuary supports a diverse fresh and marine fish population, with a total of five freshwater and five marine species recorded.	Moderate
Rarity/ distinctiveness	The estuary provides habitat and food for the 'Threatened' Australasian Bittern and the Banded Dotterel. The estuary is also utilised for habitat, passage, lifecycle and feeding of a number of native fish including the 'At Risk-Declining' longfin eel and 'Declining' inanga.	Very High
Diversity and pattern	There is a high taxonomic richness of native fish and birds that utilise the estuary.	High
Ecological Context	The ecological context score of high has been assigned based on the following criteria: - The estuary plays a significant role in ecological connection and function of the wetland (swamp) of significant regional importance. The estuary provides habitat and food sources for national rare or threatened species of birds - The estuary plays a significant role in ecological connection and function of the wetland (swamp) of significant regional importance. The estuary provides habitat and food sources for national rare or threatened species of birds.	High
Overall Value		Very High

A full Ecological Impact Assessment could not be undertaken by Pattle Delamore Partners as there was limited comparable upstream and downstream water quality and ecological data.²⁴ However, the following effects on the values of the Kaikarae Swamp Wetland, Estuary and tributaries resulting from the diffuse leachate discharge were identified:

Water quality effects

- Elevated total ammoniacal nitrogen (TAN) concentrations

²⁴ Pattle Delamore Partners (2023), p.56.

- Elevated concentrations of boron and zinc
- Disturbed physicochemical conditions (reduced dissolved oxygen and pH)

Sediment effects

- Elevated total nitrogen concentrations
- Elevated zinc concentrations

Potential aquatic ecological effects

- Chronic and non-lethal toxicity effects to aquatic organisms and community compositional shifts
- Behavioural avoidance of degraded water (e.g., causing a behavioural barrier to migratory fish passage)
- Reduced food sources for birds using the wetland-complex.

3.0 He Kaupapa Mahi: Methodology

Aukaha was contracted by Waste Management to prepare a cultural impact assessment to support an application for replacement regional consents for the aftercare of the landfill. The key elements of the project methodology are set out below.

3.1 Review of Literature

A desktop review was undertaken, focusing on detailed documentary research, to inform the drafting of a cultural values statement related to the ongoing activities at the site. Reference material has been derived from the following key sources:

- a. The Kāi Tahu ki Otago NRMP²⁵
- b. Ngāi Tahu cultural maps²⁶
- c. District wāhi tūpuna mapping
- d. Recorded archaeological sites via ArchSite²⁷
- e. Available ecological and environmental monitoring data and reports
- f. Literature review.

Other relevant policies and plans were identified as source material during the literature review.

3.2 Site Visit

A site visit was undertaken to the closed landfill in August 2023 by Te Rūnanga o Ōtākou whānau and Aukaha kaimahi with Waste Management. The site visit enabled whānau to view the site context for the landfill and its location on the Kaikarae Swamp Wetland.



Whakaahua 7: View across the Kaikarae Wetland Swamp from the landfill perimeter road (Source: Aukaha, August 2023)

²⁵ KTKO, 2005.

²⁶ TRONT, 2023.

²⁷ NZAA, 2023.

3.3 Cultural values assessment

A cultural values assessment identifies key mana whenua values in the area affected by the proposed activity.

3.4 Cultural impact statement

A cultural impact statement identifies the impacts of the proposal on the cultural values identified by manawhenua and proposes recommended actions and expectations to protect these values. In the case of this application, cultural impacts in terms of the following were a focus of the assessment:

- i. Wai māori values
- ii. Mahika kai and biodiversity values
- iii. Wāhi tūpuna

The final assessment and recommendations were presented to manawhenua representatives for review, comment, and amendment. All material released by Aukaha has been assessed and approved by manawhenua, to ensure that the final report accurately reflects the position of Te Rūnanga o Ōtākou.

4.0 Ko te Manawa Kāi Tahu: Cultural Values Assessment

4.1 Introduction

Only manawhenua have the expertise to identify values, sites, histories, and processes of cultural significance. Through a co-design process manawhenua will guide how these values and associations can be represented in culturally meaningful ways while keeping the interpretation and development in the hands of its custodians.

Manawhenua and the combined Mana Taiao and Mana Ahurea teams of Aukaha draw from Kāi Tahu cultural values and narrative documents as valuable taoka that are full of inherited cultural knowledge. This mātauraka Kāi Tahu comes under the custodianship of mana whenua.

The following cultural values and concepts have been specifically identified by manawhenua to inform the aftercare of the site, restoration of the Kaikarae Estuary and Stream, and future opportunities to strengthen intergenerational knowledge, community, and place-based identity. These values and concepts are purposefully broad to allow design responses that retain flexibility and adaptability within a co-design process that is guided by manawhenua.

Four core values lie at the core of a mana whenua worldview, namely mana, tapu, whakapapa, and mauri. Related values are shown in Whakaahua 8 and discussed below.



Whakaahua 8: Cultural values and associations with the Kaikarae Estuary and Stream²⁸

²⁸ Mana Ahurea, 2023 [unpublished material].

4.2 Mana

Mana is often loosely translated to mean the *authority* or *prestige* that manawhenua hold over their takiwā. Through the recognition of mana, manawhenua have the authority to make decisions over the whenua and waterways (both wai māori and wai tai) within their takiwā. Mana will be recognised through working relationships where manawhenua values, concepts, tikaka, pūrākau and visual identity are appropriately expressed throughout all aspects of the project.

4.3 Tapu

Mana whenua should guide discussions and lead the appropriate procedures and protocols regarding wāhi tapu sites, archaeological material, and the treatment of, and knowledge relating to, taoka. Tapu provides an element of safety and direction where there are restrictions. The Māori world is guided completely by tapu and noa.

4.4 Whakapapa

Creation and the introduction of all elements into the universe is genealogical or whakapapa-based, meaning that ultimately all things in the universe are interconnected and they also share a single source of spiritual authority.²⁹

Kāi Tahu are bound by whakapapa to the land, water and all life supported by them. The following account of Kāi Tahu whakapapa and creation stories is sourced from the words of Rāwiri Te Mamaru, a rakatira of Moeraki in the mid-1800s following the death of the famed Kāi Tahu leader, Matiaha Tiramōrehu:

Nā Te Pō, ko Te Ao	<i>From eternity came the Universe</i>
Nā Te Ao, ko Te Ao Marama	<i>From the Universe, the bright clear light</i>
Nā Te Ao Marama, ko Te Ao Tūroa	<i>From the bright clear light, the enduring light</i>
Nā Te Ao Tūroa, ko Te Kore Te Whiwhia	<i>From the enduring light, the void unattainable</i>
Nā Te Kore Te Whiwhia, ko Te Kore Te Rawea	<i>From the void unattainable, the void intangible</i>
Nā Te Kore Te Rawea, ko Te Kore Te Tamaua	<i>From the void intangible, the void unstable</i>
Nā Te Kore Te Tamaua, ko Te Kore Matua	<i>From the void unstable, the void endowed with paternity</i>
Nā Te Kore Matua, ko Te Mākū	<i>From the void of paternity came moisture</i>
Nā te Mākū, ka noho i a Mahoranui-ātea	<i>From the moisture came limitless thought.</i>
Ka puta ki waho ko Raki	<i>Then came the visible heavens</i>
Nā Raki, ka noho i a Pokoharua-te-Pō	<i>The visible heavens combined with the great abyss to produce the numberless sorceries and the ultimate calamity!</i>
Ko Aoraki me Rakamaomao, tana a Tāwhirimātea	<i>Thence to Aoraki and the winds and weather</i>
Ka tū te Rakiwhānoa	<i>To the creator of land</i>
Ui rā ki Te Maha-a-nui ā Māui	<i>And the canoe of Māui.</i>

²⁹ Pōtiki, 1996.

Ko te Ao Tākata!

And finally, to people!

Thei mauri ora!

I cough, the breath of life.

Wai is a central element in our creation traditions and is present very early in the whakapapa of the world. In this kōrero, darkness gives rise to the light, and through an abyss of nothingness, moisture materialises as the first iteration of wai.

The whakapapa continues down to Rakinui and his wives, Pokoharua-te-Pō and Papatūānuku. The children of Rakinui and his wives created the elements of te taiao, including mountains, rivers, forests, and seas, and all living things. Kāi Tahu claim the same descent from Raki and his wives.

Everything in existence is acknowledged and connected through whakapapa. Whakapapa establishes the ancestral rights which give mana whenua the mana and kaitiaki responsibilities over their takiwā. It is important that opportunities to uncover, reference and share the whakapapa of place and people be explored through this project to enhance a collective sense of place and identity.

4.5 Mauri

Mauri is a life-giving force that flows from our living world and down through whakapapa, connecting and binding together all aspects of our world.

Mauri is an observable measure of environmental health and well-being. Waterbodies and estuaries with an intact and strong mauri sustain healthy ecosystems and support mahika kai and other cultural values. The primary resource management principle for manawhenua is the protection of mauri. Concepts such as tapu, noa and rāhui are therefore applied by manawhenua to protect the mauri of a resource.

However, the mauri of a waterway or estuary is unable to protect itself against unnatural actions and interventions such as damming, diversions, altered flow regimes, discharges, and reclamation. Manawhenua have seen this pattern take place over and over throughout the history of European settlement in Te Waipounamu, with many behaviours and actions that undermine and degrade the mana and the mauri of our waterways and estuaries still in evidence today. For the Kaikarae Wetland and Estuary this history is implicitly linked to the construction of the Green Island and the Fairfield landfills on the wetland and estuary and to a long history of industrial discharges into the Kaikarae Stream higher up the catchment.

The protection of mauri should inform project design and particular consideration should be given to protection and enhancement of water quality, biodiversity, and social wellbeing.

4.6 Rakatirataka and Kaitiakitaka

Rakatirataka refers the exercise of mana to give effect to manawhenua culture and traditions. In the management of the natural world, rakatirataka is underpinned by the obligations placed on manawhenua as kaitiaki. Kaitiakitaka is an expression of rakatirataka. Wai māori is a taoka that is governed under the domain of rakatirataka, in accordance with tikaka and the principles of kaitiakitaka.

The whakapapa connection with te taiao imposes a kaitiakitaka obligation on manawhenua to protect wai and all the life it supports, in accordance with customs, knowledge, and mātauraka developed over many generations. The duty of kaitiakitaka is not merely about guarding or caretaking but involves acting as an agent for environmental protection and decision-making, on behalf of tūpuna

and mokopuna. The focus of kaitiakitaka is to ensure environmental sustainability for future generations, as expressed in the whakataukī; mō tātou, ā, mō kā uri a muri ake nei.

4.7 Mātauraka

The body of Māori knowledge and understanding which encompasses (among other things) the Māori world view and perspectives, traditional knowledge, and practices.

4.8 Tikaka

Tikaka is derived from the word 'tika' meaning right or correct, and therefore in this context references behaviour and design outcomes that are culturally appropriate. In this context we have applied tikaka as a core value as it fits with the values and general aspirations for a well thought-out and executed project. Manawhenua engagement throughout all phases of the aftercare of the landfill site will allow them to guide culturally appropriate actions at the correct times.

4.9 Utu

Utu in this context is about an intent to redress historical and current imbalances in ecological and built forms through design. The landfill was progressively built on the Kaikarae Estuary resulting in a significant loss of ecological and cultural values. The closure and aftercare of the site provides an opportunity to restore ecological balance to the degraded estuary, wetland and tributaries.

4.10 Maumaharataka

Historical events regarding Māori are often excluded from the public narrative, or not fairly or correctly recorded. Maumaharataka emphasizes the importance of upholding memories of the past and communicating manawhenua pūrākau of place, including place names, cultural heritage, and narratives. This strengthens intergenerational knowledge, community, and place-based identity. The staged closure and aftercare of each part of the landfill creates opportunities for interpretation of pūrākau of place, including place names, cultural heritage and narratives associated with the Kaikarae Wetland and Estuary.

4.11 Tapatapa

Tapatapa is a manifestation of mana through the naming of landscapes by our tūpuna. The placenames Rākaihautū left behind as he laid claim to many areas in the South Island are an example of tapatapa. Placenames are important as they are from the earliest migrations and people. These placenames must always be referred to, and never replaced with others if the original name is available. Tapatapa provides opportunities for strengthening intergenerational memory, and cultural and place-based identity.

4.12 Oraka

Oraka represents the act of resting or an area of rest. The environmental regeneration of the Kaikarae Wetland and Estuary provides an opportunity to express this value at appropriate stages during the closure and aftercare of the landfill.

4.13 Taoka

Indigenous species are valued as taoka by manawhenua, as are the habitats in which taoka species survive and thrive. The ecosystems provided by wai māori in lakes, rivers, wetlands, estuaries, and on the coast offer lifegiving habitats for indigenous species. Whanaukataka is at the heart of this

relationship. Thus, when the health of a waterway or estuary is degraded, the impacts are far-reaching, for the waterway, for the ecosystems, habitats, and species it supports, and for the people.



Whakaahua 9: Pātiki (Black flounder)³⁰

³⁰ Clarke, 1870.

5.0 He taura whiri kotahi: Manawhenua associations with the Kaikarae Estuary

5.1 Introduction

The tūpuna of manawhenua today were active in the Kaikarae Estuary and the surrounding landscape for many centuries. Archaeological evidence of moa-hunting closer to the river mouth suggests that the site was visited more than 600 years ago. The moa abruptly became extinct about 600 years ago in the 15th century BCE, probably due to “having a niche with unusually high marginality.” While the moa previously was only predated by the pouākai, on arrival of people, they were unable to support the “low but sustained harvest rates,” mainly due to their limited reproductive capacities as a species.

5.2 Wāhi Tūpuna

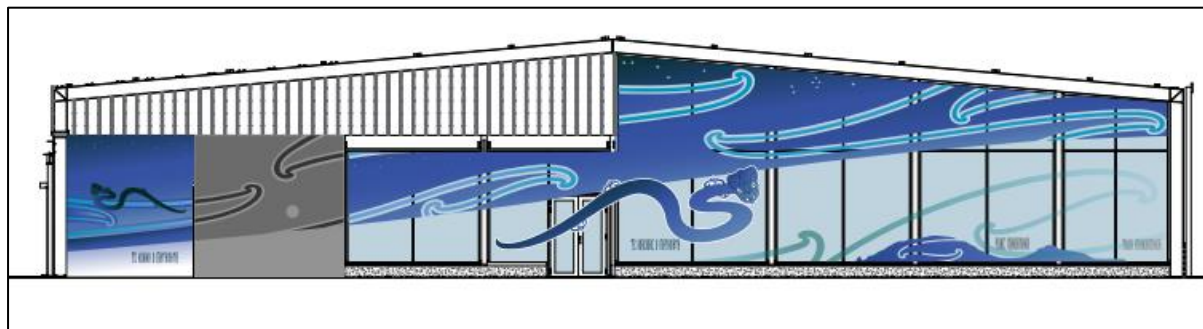
Wāhi tūpuna are interconnected ancestral places, landscapes and taoka that reflect the histories and traditions of manawhenua. Wāhi tūpuna are characterised not only by natural and physical aspects, but also by the place names and associated traditions and events that bind manawhenua to the landscape. The Kaikarae Wetland and Estuary is part of an integrated cultural landscape for mana whenua, as described by Tūtohi 4:

Tūtohi 4: Wāhi Tūpuna in the area surrounding the Fairfield Landfill site³¹

Ikoa Māori	Location/Ikoa Pākehā	Description
Pakaru	Kaikarae Lagoon	Pakaru is the traditional Māori name for the Kaikarae Lagoon, near the mouth of the Kaikarae stream. Along with Kaikarae, Pakaru was an important kāika mahinga kai for local Kāi Tahu. During the 1879 Smith-Nairn Royal Commission of Inquiry into the Ngāi Tahu land claims, local Ngāi Tahu kaumātua recorded Pakaru as a kāika mahika kai where tuna and pātiki were gathered.
Kaikarae	Kaikarae Lagoon and Stream	Kaikarae is associated with the Waitaha explorer Rākaihautū. Upon arriving at Whakatū in the Uruao waka, Rākaihautū divided his people into two groups. His son, Rakihouia, took one party to explore the coastline, and Rākaihautū led the other party through the interior of Te Waipounamu and down to Murihiku, using his kō named Tūwhakaroria to dig out most of the fresh-water lakes of Te Waipounamu. While travelling back up the island, Rākaihautū and his party stopped at the mouth of a stream to eat, and their food was a seabird known as karae. This particular location and stream were named Kaikarae.

³¹ TRONT, 2023.

Pukemakamaka	Saddle Hill	Matamata was the kaitiaki of Kāti Māmoe chief Te Rakitauneke and is attributed to carving out the Ōtākou harbour and the Taiari river in search of his lost master when they became separated. The taniwha finally resting where Saddle Hill is now, becoming the peaks Turi-makamaka and Pukemakamaka.
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Whakaahua 10: Matamata design by Ephraim Russell for the Taiari Aquatic Centre³²



Whakaahua 11: Kaikarae Estuary 1926³³

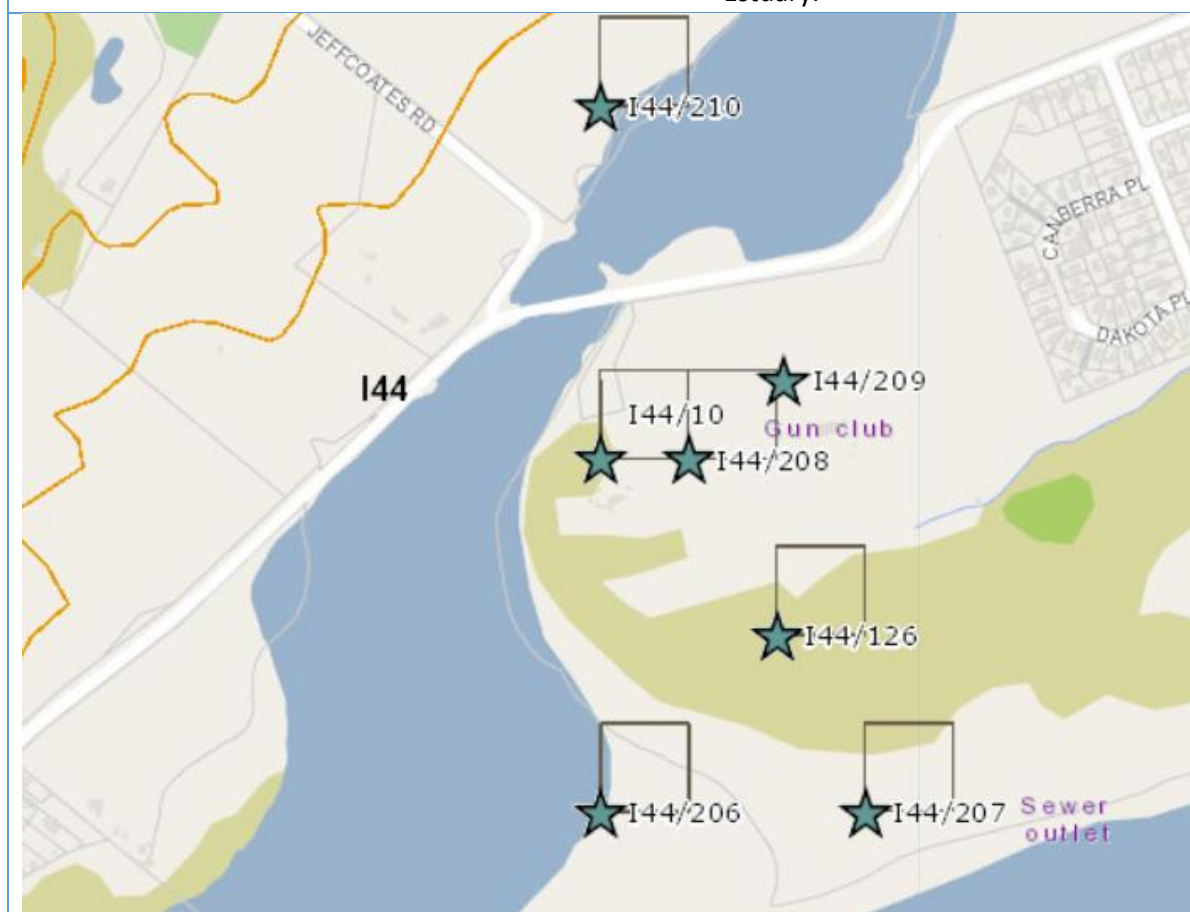
Recorded archaeological sites in the area provide further evidence of a long history of occupation and use of the Kaikarae Estuary, with finds of a moa hunter camp at the mouth of the Kaikarae Stream (I44/206), middens and artefacts, as described in Tūtohi 5 below.

³² Image credit: Mana Ahurea & Russell, 2022 [unpublished material].

³³ Image credit: Hocken Library, 2023.

Tūtohi 5: Recorded Māori archaeological sites on the Kaikarae Estuary³⁴

Site number	Description	Details
I44/10	Midden / Oven	Midden (mainly pipi, with cockle and mudsnail), hangi stones. Findspot for a saw-like abrader and a small adze.
I44/126	Midden / Oven	Midden with stone flakes, charcoal, shell, and moa bone.
I44/206	Nohoaka / Kaika	A moa hunter camp which was washed away in the early 1950s with the change of course at the mouth of the Kaikarae Stream. The site had included a shell midden with stone lined hearths, moa bones and artefacts.
I44/207	Artefact	Find of adzed wooden object.
I44/208	Midden	Midden of cockle and pipi.
I44/209	Midden	Midden that included cockle, pipi and mudsnail.
I44/210	Artefact	Cache of adzes of grey basalt located on the south side of the Kaikarae Estuary.



³⁴ NZAA, 2023.

5.3 Ara Tawhito and Ara Hikoi

Traditional travel routes through the interior and along the coast connected manawhenua to places of importance for gathering and harvesting mahika kai and connected sites of permanent and seasonal occupation. Kāi Tahu rakatira Te Raki provided instructions about kā ara tawhito to early Pākehā officials who sought to traverse Otago by foot.³⁵ Old tracks followed “along the western hill-tops, the line of Kaikarae Valley, and the seacoast.”³⁶ Other Kāi Tahu trails proceeded from Kaikarae over Whakaari or Whānau-paki, to Waikōuaiti.³⁷



*Whakaahua 12: Kaikarae Estuary and Pukemakamaka 1951*³⁸

5.4 Mahika Kai

Mahika kai practices underpin the manawhenua relationship with Otago’s rivers, lakes, wetlands, and estuaries. Cultural identity as whānau and hapū is tied to resources, which are significant taoka. Fundamental to the culture and economy of manawhenua is the ability to learn and practise customary gathering of food and other resources, to put kai on the table at the marae and at home, for trade and diplomacy, and to ensure that the knowledge of customary practices is passed on from generation to generation.

The coastal estuaries, lakes and wetlands of the Otago region once supported rich and healthy mahika kai resources, including a range of shellfish, sea fishing, eeling, and harvest of other freshwater fish in

³⁵ Shortland, 1851.

³⁶ Griffiths & Goodall, 1980, p. 21.

³⁷ Pybus, 1954, p. 117.

³⁸ Image credit: White Aviation Ltd., 1951.

lagoons, wetlands, and rivers; waterfowl, sea bird egg gathering, and forest birds; and a variety of plant resources including harakeke, fern and tī kōuka root. The manawhenua reliance on these coastal resources increased even further after the land sales of the 1840s and 1850s, and the associated loss of access to much traditional land-based mahika kai.

For mahika kai to be sustained, populations of species must be present across all life stages and must be plentiful enough for long term sustainable harvest. Safe access to mahika kai sites must be available: kai must be safe to gather, safe to harvest and safe to eat, and management and harvesting practices must be able to be carried out in accordance with tikaka.

The transmission of mātauraka necessitates whānau being able to access healthy mahika kai to carry out customary practices. The restoration of the mauri of Kaikarae estuary to provide healthy habitat for mahika kai and taoka species is a long-term vision for Ōtākou whānau.³⁹ The closure and aftercare of the Fairfield landfill is significant step towards achieving that vision.



Whakaahua 13: Tuaki

³⁹ During consultation with Ōtākou whānau as part of the development of the Proposed Otago Land and Water Regional Plan, whānau acknowledged that this was long-term vision given the current degraded state of the estuary.

6.0 E rite ana ki te karo o te moa: The Kāi Tahu history of loss

Te Tiriti o Waitangi was signed by representatives of Kāi Tahu whānui in late May and early June of 1840.⁴⁰ Subsequently, in 1844 and 1864, Kāi Tahu agreed to a series of land sales with the Crown.

The Otago Deed was signed at Kōpūtai Port Chalmers on the 31st of July 1844. The terms of the purchase agreement provided for the sale of more than 400,000 acres of Kāi Tahu land to the New Zealand Company for £2,400.⁴¹ The Deed includes reference to Kaikārae as a boundary of the land sale, indicating its broader significance within the rohe for the rakatira present.

Kāi Tahu withheld from sale lands at Taiari, Ōtākou and Te Kāroro, an area totalling approximately 9,600 acres⁴² In addition, Kāi Tahu understood that they would retain their valued lands, mahika kai, and sea fisheries, in addition to “ample reserves” for their present and future needs.⁴³ Such promises were not fulfilled, and further lands were not reserved for Kāi Tahu.⁴⁴

Over time the ancestral lands were surveyed, sold, and settled; it became increasingly difficult to follow kā ara tawhito and to access wāhi tūpuna and wāhi mahika kai. Changes in the ancestral landscape and the loss of mahika kai resources impacted on Kāi Tahu communities, contributing to the displacement of whānau, loss of knowledge and identity, and economic hardship.

Reserve land came under pressure from settlers, including the lands reserved for Ōtākou on the Otago Peninsula. To protect their land holdings from encroachment, whānau became entrenched in their coastal kāika, contributing to the dwindling of the connection to important sites further afield, with which they became increasingly alienated and disassociated. When efforts to reinstate these connections were initiated, whānau often found that the values and attributes that tūpuna had identified in the past were either highly degraded or simply gone.⁴⁵ In the area surrounding the Kaikārae Lagoon, the impact of land-use activities, including that related to the landfill site, has contributed to the degradation of what was a significant wāhi mahika kai in the past.

The significance of mahika kai as a cornerstone of Kāi Tahu kawa and tikaka cannot be overstated. It was through these practices that knowledge and skills were handed down, and through the seasonal practice of heke that the relationship with whenua and wai māori was sustained. This continued reaffirmation of ahikāroa across the seasons was required to affirm rakatirataka and mana, but also provided opportunities for reconnection with the deeds, stories, and learning of tūpuna.

Thus, the deprivation suffered by Kāi Tahu over this time encompassed not only the material loss of land as an asset base and seasonal mahika kai resources, but the loss of a spiritual connection to te taiao, of the ability to exercise rakatirataka, a fundamental building block of Kāi Tahu life and identity, and the transmission of mātauraka.⁴⁶

The loss of connection to the whenua that took place due to the Otago Deed, coupled with the visible deterioration, degradation and modification of lakes, rivers, waterways and estuaries since that time, is a source of great mamae for mana whenua. This is particularly true given the obligations on mana whenua as kaitiaki whenua in their takiwā.

⁴⁰ Waitangi Tribunal, 1991, s4.2.

⁴¹ When the land was surveyed in the following years, the actual extent of the Otago Block came to 534,000 acres. Rakiura Māori Land Trust, 2013, p. 26.

⁴² Waitangi Tribunal *The Ngāi Tahu Report* (Wai 27, 1991) vol. 1, pp. 30-31.

⁴³ Several witnesses also recalled that Kāi Tahu were promised ‘tenths’, in a similar scheme to the ‘tenths’ allocations that were sanctioned at the Whakatū sale and at other sales in the North Island. Evison, 2007; Dacker, 1994.

⁴⁴ Dacker, 1994, p. 21.

⁴⁵ Waitangi Tribunal, 1991.

⁴⁶ Waitangi Tribunal, 1991.

7.0 He Ara Poutama: Statutory framework

This section is not exhaustive but provides a brief description of the guidance in the statutory framework that is relevant to the cultural values discussed above.

7.1 Resource Management Act (RMA) 1991

The management of natural and physical resources in New Zealand is governed by the Resource Management Act (RMA) 1991. Part 2 of the RMA specifically speaks to the importance of recognising takata whenua values.

The relationship of manawhenua with the Kaikarae Estuary is a matter of national importance that must be recognised and provided for in managing natural and physical resources.⁴⁷ The depth and breadth of the longstanding relationship manawhenua have with the Kaikarae Estuary and the surrounding area is discussed in Section 5.0.

In achieving the purpose of the Act particular regard must be had to kaitiakitaka.⁴⁸ Manawhenua exercise kaitiakitaka in this catchment. Maintaining a balance between the right to access and use natural resources, and the responsibility to care for te taiao, with a focus on providing a sustainable base for future generations is implicit in kaitiakitanga. This is the underpinning meaning of the whakataukī, mō tātou, ā, mō kā uri ā muri ake nei.⁴⁹

The principles of the Treaty of Waitangi (Te Tiriti o Waitangi), including the principles of active protection of mana whenua interests,⁵⁰ recognition of rakatirataka⁵¹ and partnership⁵² must also be considered.⁵³ Involvement of mana whenua in the future aftercare of the landfill site, including co-design of rehabilitation and restoration of the estuary, wetland and tributaries is an important means of implementing these principles.

7.2 National Policy Statement for Freshwater Management 2020 (NPSFM 2020)

The concept of Te Mana o te Wai has been part of the NPSFM since 2014. However, Te Mana o te Wai was brought to the forefront of freshwater management in Aotearoa through NPSFM 2020 (updated 2024).

Te Mana o te Wai recognises that protecting the health of freshwater (te hauora o te wai) protects the health and wellbeing of the wider environment (te hauora o te taiao). The NPSFM 2020 recognises the relationship of manawhenua with freshwater and requires that Māori freshwater values are provided for and that mana whenua are actively involved in freshwater management processes.⁵⁴

Policy 6 requires that there is no further loss of extent of natural inland wetlands, their values are protected, and their restoration is promoted. The NPSFM 2020 and the related National Environmental Standards for Freshwater 2020 (NESF) provide for operation of landfills in and near

⁴⁷ Resource Management Act 1991, section 6(e)

⁴⁸ Resource Management Act 1991, section 7(a)

⁴⁹ “For us and our children after us.”

⁵⁰ *New Zealand Māori Council v Attorney-General* [1987] 1 NZLR 641 at 664.

⁵¹ *Waitangi Tribunal, Motunui-Waitara Report*, pg 51.

⁵² *Te Rūnanga o Wharekauri Rekohu v Attorney-General* [1993] 2 NZLR 301, Cooke J.

⁵³ Resource Management Act 1991, section 8.

⁵⁴ NPSFM 2020 Clause 1.3(4)(a)-(c), Policy 2, Clause 3.4.

wetlands in some circumstances, but require that, if adverse effects on the wetland cannot be avoided, they are managed in accordance with an effects management hierarchy.⁵⁵

7.3 Ngāi Tahu Claims Settlement Act 1998 (NTCSA 1998)

The NTCSA 1998 was enacted to settle the historical Ngāi Tahu claims against the Crown and provides redress under Te Tiriti o Waitangi. The Crown apology in section 4 explicitly recognises the rakatirataka of Kāi Tahu within its takiwā. The Act provides specific provisions that provide for the exercise of rakatirataka and kaitiakitaka by manawhenua in relation to mahika kai, taoka species, and other resource management matters. These include rights in relation to the management of specified significant areas including statutory acknowledgement areas.

The Kaikarae Estuary is in part within the coastal marine area (**CMA**). Te Tai o Arai Te Uru (Otago Coastal Marine Area) is a Statutory Acknowledgement Area under the Ngai Tahu Claims Settlement Act 1988.

7.4 Proposed Otago Regional Policy Statement (PORPS)⁵⁶

The objective and policies relating to Te Mana o te Wai in the PORPS were developed in consultation with mana whenua, as required by the NPSFM 2020, and reflects the Kāi Tahu ki Otago perspective on wai māori as follows:

LF-WAI-01 Te Mana o te Wai

Otago's water bodies and their health and well-being are protected, and restored where they are degraded, so that the mauri of those water bodies is protected, and the management of land and water recognises and reflects that:

- (1) water is the foundation and source of all life - nā te wai ko te hauora o kā mea katoa*
- (2) there is an integral kinship relationship between water and Kāi Tahu whānui, and this relationship endures through time, connecting past, present and future,*
- (3) each water body has a unique whakapapa and characteristics,*
- (4) fresh water, land and coastal water have a connectedness that supports and perpetuates life,*
- (4A) protecting the health and well-being of water protects the wider environment, and*
- (5) Kāi Tahu exercise rakatirataka, manaakitaka and their kaitiakitaka duty of care and attention over wai and all the life it supports.*

Te Mana o te Wai policies require that:

- The environmental, social, cultural, and economic relationships of Kāi Tahu with water bodies are sustained and mātauraka is incorporated into freshwater decision-making, management and monitoring processes (LF-WAI-P2(2) and (4))
- The habitats of mahika kai and taoka species associated with water bodies are sustained and restored (LF-WAI-P3(1)(c)).

This policy direction is also reflected in the long-term freshwater vision for the Dunedin & Coast Freshwater Management Unit (FMU),⁵⁷ and in the objective for wetlands (LF-FW-O9(1)).

⁵⁵ NPSFM 2020 Clause 3.22(1)(f); NESF Clause 45B.

⁵⁶ The discussion in this section refers to the PORPS as amended by decisions on submissions (30 March 2024).

⁵⁷ PORPS as amended by decisions, March 2024, see LF-FW-O1A(1) and (5), LF-VM-O5(3).

The PORPS objectives for wāhi tūpuna are also relevant, requiring protection of the values of wāhi tūpuna (HCV-WT-O1) and recognition and provision for rakatirataka and kaitiakitaka over these areas (HCV-WT-O2).

7.5 Regional Plans

Both the *Regional Plan: Water* and *Regional Plan: Waste* are relevant to this application.

Regional Plan: Waste (incorporating Plan Change 1)

Chapter 3 Manawhenua Issues describes mana whenua concerns about waste management and includes objectives requiring that:

- The quality of Otago's natural and physical resources is not degraded by wastes (3.3.1)
- The mauri of waste-affected resources is restored (3.3.2)
- Waste management practices are compatible with Kai Tahu values (3.3.3)
- A holistic approach is taken to waste management (3.3.4).

Chapter 7 sets out objectives, policies and rules for landfills. Policy 7.4.1 recognises and provides for the relationship of Kāi Tahu with natural and physical resources by requiring that:

- management and disposal of waste is provided for in a way that takes into account Kāi Tahu values, protects wāhi tapu and wāhi taoka and does not compromise Kāi Tahu access to wāhi tapu and wāhi taoka
- Kāi Tahu are consulted on issues relating to landfill management.

The policies for contaminated sites are relevant to guide longer term management of the site. Policy 5.4.1 requires recognition of the relationship of Kai Tahu with natural and physical resources by:

- Carrying out remediation and mitigation of contaminated sites in a manner that takes into account Kāi Tahu cultural values;
- Protecting wāhi tapu and wāhi taoka, and access to them by Kāi Tahu, from the effects of contamination;
- Acknowledging that future generations will inherit the results of work carried out to remedy or mitigate contaminated sites; and
- Consultation with Kāi Tahu on issues relating to site contamination.

Policy 6.3.2 requires that effects of hazardous substances and hazardous wastes on traditional water, land and mahika kai values of importance to Kāi Tahu are avoided, remedied or mitigated, and Policy 6.4.12 includes similar direction to that in Policy 5.4.1 for contaminated site management.

Regional Plan: Water (RPW)

Schedule 1D in the RPW identifies spiritual and cultural beliefs, values and uses of significance to Kāi Tahu in respect to specified water bodies, and these are required to be maintained or enhanced.⁵⁸ Schedule 1D identifies the following values associated with Kaikarae Stream:

- Kaitiakitaka
- Mauri

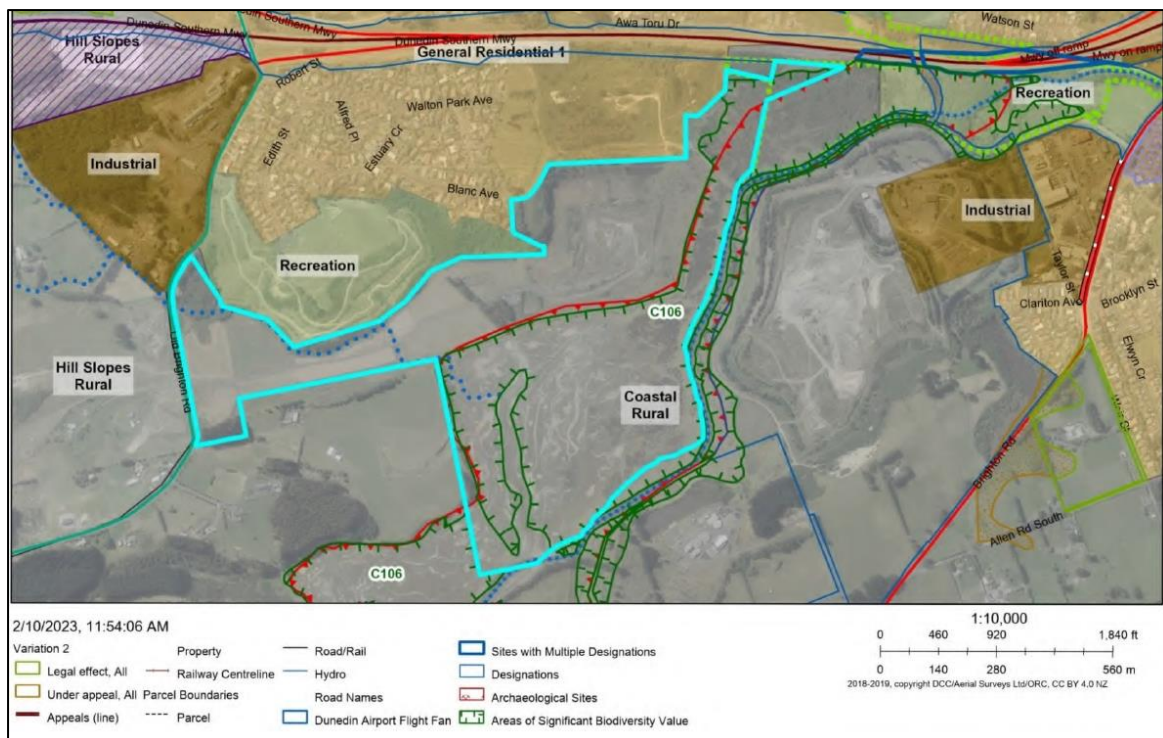
⁵⁸ Regional Plan: Water, Objective 5.3.2.

- Wāhi tapu and/or waiwhakaheke (wāhi tūpuna)
- Wāhi taoka
- Mahika kai
- Kohaka (nursery/spawning areas for indigenous species)
- Trails
- Cultural materials.

Kaikarae Lagoon Swamp is also identified in the RPW as a Regionally Significant Wetland. The values and uses of such wetlands must be recognised and sustained.⁵⁹

7.6 Dunedin Second Generation District Plan (2GP)

The wāhi tūpuna values of the Kaikarae Estuary are recognised in the 2GP, with reference specifically to mahika kai and archaeological values.⁶⁰ The area is also subject to an archaeological alert layer. The estuary and lagoon are identified as an Area of Significant Biodiversity Value (C106) with regional significance, highlighting the importance of the habitat for mahika kai and other taoka species.



Whakaahua 14: Planning map (Dunedin City Council). (Tonkin & Taylor 2024, Figure 4.2)

The wāhi tūpuna values associated with Kaikarae (the Kaikorai Estuary) in the 2GP are:

A4.51.1 Description of area

A mahika kai for adjacent coastal settlements, providing eels, waterfowl, birds and kai moana. The first known site to be named in Dunedin ('Kaikarae' - where a seabird was cooked and eaten) by Rakaihautu, a Waitaha chief who first explored the southern coast. This site has linkages to the beach north of the Kaikarae estuary.

⁵⁹ Regional Plan: Water, Objective 10.3.2.

⁶⁰ DCC, 2021, Schedule A4, A4.51.

A4.51.2 Values to be protected

Historical mahika kai. Of less value now due to pollution.

Archaeological remains.

The cone of Pukemakamaka to the west of the site is identified as an Outstanding Natural Feature (ONF), and its higher slopes identified as a Significant Natural Landscape (SNL) in the 2GP. Pukemakamaka and Turi-makamaka are identified in the 2GP as wāhi tūpuna of cultural significance to manawhenua. The 2GP requires that the relationship between manawhenua and the natural environment, including the cultural values and traditions associated with wāhi tūpuna and mahika kai, is maintained or enhanced. Policies for achieving this objective require that adverse effects of the following are addressed:

- Effects of activities in or adjacent to wetlands on mahika kai values, where these wetlands are identified as wāhi tūpuna.
- Effects of landfills on mana whenua values.⁶¹

7.7 Kāi Tahu ki Otago Natural Resource Management Plan 2005 (NRMP)

The NRMP is the operative Iwi Management Plan which sets out Otago Papatipu Rūnaka aspirations in relation to natural resource management in their takiwā. The NRMP is founded on the concept of 'Ki Uta ki Tai,' which emphasises the holistic nature of te ao Māori.

The provisions of the NRMP provide important guidance as to what is needed to fulfil the obligations of sections 6(e), 7(a) and 8 of the RMA. Relevant provisions of the NRMP are set out in Appendix 2. The provisions are wide-ranging, but require:

- Recognition of the spiritual and cultural significance of wai to Kāi Tahu.
- Reduction in contaminants being discharged directly or indirectly to water.
- Restoration of the mauri of wai māori and coastal waters.
- Rehabilitation of contaminated environments.
- Protection of wetlands.
- Protection of the habitats and wider needs of mahika kai and taoka species, and restoration and enhancement of indigenous biodiversity.
- Recognition and support for the rakatirataka and kaitiakitaka of Kāi Tahu in resource management, including through:
 - involvement in the development of monitoring programmes, and
 - recognition of rakatirataka by empowering mana whenua interpretation of their histories and associations with wāhi tūpuna.

⁶¹ Objective 14.2.1

8.0 Cultural Impact Assessment

8.1 Introduction

The Kaikarae Estuary, Wetland and its associated waterways hold great significance for manawhenua. Manawhenua have longstanding concerns over the degradation of the estuary, wetlands and tributaries due to past and current land uses, which include landfilling and industrial discharges into the Kaikarae Stream. The aftercare of the Fairfield Landfill requires careful management to mitigate potential adverse effects on wai māori, taoka species and indigenous biodiversity.

Manawhenua hold the long-term aspiration of restoring the Kaikarae Estuary, Wetland and surrounding waterways to their traditional state.

8.2 Wai Māori

For manawhenua, wai is a taoka under their mana and rakatirataka. Rather than implying an economic model of ownership, manawhenua view the protection and enhancement of wai as part of their role as kaitiaki, a role which is inherited through whakapapa. While few restrictions existed around placing landfills within and adjacent to estuaries and wetlands in the 1960's, the concept of 'Te Mana o Te Wai' now pervades freshwater management in Aotearoa. This concept places the highest priority on the health and well-being of waterways and wetlands. Involvement of manawhenua is vital to the implementation of Te Mana o Te Wai and manawhenua have had input into the PRPS which affirms the Kāi Tahu ki Otago interpretation of Te Mana o Te Wai in their takiwā.

The Kaikarae Estuary, Wetland and the other associated waterways have immense traditional significance to manawhenua. As stated previously, manawhenua today seek to restore the estuary, wetland and tributaries to their traditional state. Embarking on a journey of restoration is embodied by the manawhenua value, utu. Utu will be realised through the rehabilitation and restoration of the estuary, wetland and tributaries. This starts with ensuring leachate and contaminants are not able to enter the estuary, wetland and tributaries during all phases of the landfill aftercare. The ecological impacts of leachate and other contaminants on taoka species is one of the principal concerns that manawhenua have in relation to the closed landfill site. The construction of landfills on and near the Kaikarae Wetland and Estuary, in combination with other industrial discharges, has degraded the mauri of the Kaikarae Stream and surrounding area across decades and has made the area tapu, so that it cannot be used for mahika kai.

Groundwater is hydraulically connected with surface water from the Kaikarae Stream. This means that the water level of the Stream decreases when groundwater is abstracted from the leachate collection trench. Mauri and whakapapa are integrally connected to the natural behaviour of the waterway, and even small changes to the natural hydrology will affect them. If contaminants from leachate or sediment enter groundwater or surface water, this would further degrade the mauri of the Kaikarae Stream and surrounding area, hindering the restoration efforts of both manawhenua and other stakeholders. Contaminants can have negative impacts on the water quality, as well as on the ecosystems and all life that is sustained within that waterway. This includes avifauna, aquatic fish, invertebrates, vegetation, and riparian vegetation.

The AEE also states that low lying areas adjacent to the landfill site are at risk of flooding and storm surge from the Kaikarae Stream and Estuary. These risks will be further exacerbated by climate change and sea level rise. The removal of waste from closed coastal landfills in the Waitaki District highlights

the risk that climate change poses to historic landfills.⁶² Monitoring and provision for the impacts of climate change are a key focus for mana whenua. It is vital that there are robust mitigation and monitoring measures in place to ensure that the landfill does not become inundated, causing leachate and other contaminants to flow into the Kaikarae stream and surrounding waterways.

Groundwater monitoring data indicates that the leachate collection system appears to be drawing in groundwater from outside the trench and reducing the movement of contaminated groundwater into surface water. However, the monitoring also indicates that the trench more effectively intercepts leachate nearer the surface and appears to be less effective at intercepting leachate migration at depth (evidenced by the elevated TAN concentrations in the deeper monitoring wells).

In terms of restoring the mauri of the area, the data from the groundwater technical assessment indicates that further analysis into the efficacy of the leachate trench is required to more fully understand the relationship between leachate from the landfill site and the elevated contaminant concentrations in the wetland-estuary. Although the high-level estimates indicate that between 95.4 - 99.4 % of the leachate is being intercepted by the trench, monitoring data also indicates that concentrations of contaminants within the wetland-estuary are beyond NPS-FM 2020 limits for species protection. Further monitoring sites may be needed to better understand both the location of the groundwater discharge, and to inform the remediation pathway required to mitigate the effects of the landfill on the wetland and estuary.

If the potential adverse impacts described above were to occur, this would further degrade waterways which are already currently in poor health. It is the aspiration and duty of manawhenua as kaitiaki to enhance the health and wellbeing of all bodies of water.

Recommendations: Wai Māori

- That all practicable measures are taken to prevent discharges entering water, including preventing, where possible, leachate from entering groundwater and surface water. The interception trench around the perimeter of the landfill is the primary mitigation measure to prevent the outward flow of leachate, as the landfill is unlined. Waste Management should investigate and implement engineering solutions to improve the effectiveness of the interception trench in preventing the outflow of leachate to the Kaikarae Wetland and Estuary.⁶³
- That Waste Management develop and implement a climate change adaptation strategy as part of the landfill closure management plan.
- That effects on mauri and whakapapa from the alteration of the existing hydrology and from contaminants entering water are offset by mitigation measures, including riparian planting, contaminant mitigation and pest management.
- Proposed offsetting or mitigation management plans must be provided to mana whenua for review and consultation prior to implementation. While these measures do not directly address the adverse effects on mauri, they will contribute to enhancement of the mauri of the area.

Values: Mana, Mauri, Whakapapa, Rakatirataka and Kaitiakitaka, Tapu, Utu, Taoka.

⁶² Waitaki District Council, Project Reclaim: <https://www.waitaki.govt.nz/Services/Rubbish-Recycling-Waste-Minimisation/Project-Reclaim>

⁶³ Refer to Appendix 4.

8.3 Mahika Kai and Biodiversity Values

Prior to European settlement, the Kaikarae Stream catchment would have supported large wetland areas surrounding several defined streams, with hillslopes and elevated areas supporting mixed podocarp hardwood forest, with mataī, tōtara, rimu, māhoe and narrow-leaved houhere dominant on coastal hills. In the lower catchment, freshwater wetland and forest areas would have graded to intertidal / saltmarsh areas.⁶⁴

Kaikarae Lagoon is listed as an Area of Significant Biodiversity Value (C106) in the DCC 2GP. The indigenous vegetation and habitats of the lagoon are of regional significance and include estuary mudflat, saltmarsh, reed swamp, and succulent herb swamp.⁶⁵ Kaikarae Lagoon is also listed as a regionally significant wetland by ORC in the Water Plan.⁶⁶

The habitats and species of Kaikarae Stream and Lagoon are assessed and described in the Groundwater, Surface Water and Ecological Assessment prepared by Pattle Delamore Partners (2023). A summary of the flora and fauna is provided below.

The indigenous vegetation of the saltmarsh comprises of shore leptinella,⁶⁷ oioi (jointed wire rush), māakoako (sea primrose) and mākaka (saltmarsh ribbonwood). In the estuary, marine macroalgae (in particular, ulva) dominate.

Nine native fish species have been recorded in Kaikarae Stream (including inanga, common bullies, upland bullies, koura, shortfin eels, longfin eels and lamprey), and four species are recorded in the wetland (most commonly eels). Freshwater and marine species are recorded in the estuary (including black flounder, inanga, yellow-eye mullet, and banded kōkopu).

Over 15 bird species are known to use the Wetland-Estuary, which is recognised as an important habitat for Australasian Bittern and Banded Dotterel, and a habitat utilised by white-faced heron, oystercatchers and paradise shelducks.⁶⁸

Recommendations: Mahika Kai and Biodiversity Values

- The restoration of the biodiversity values of the Kaikarae Estuary, Wetland, and tributaries is sought to provide for the habitats and wider needs of mahika kai and taoka species and to rebalance the mauri of the wetland and estuary.
- An Ecological Impact Assessment should be undertaken to guide the development of a Restoration Plan for the Kaikarae Estuary, Wetland and tributaries.
- The Restoration Plan for the Kaikarae Estuary, Wetland and tributaries should be developed in partnership with manawhenua.
- Collaboration with the Dunedin City Council on the restoration of the Kaikarae Estuary, Wetland, and tributaries is encouraged to enable holistic management of the effects of the Green Island and Fairfield Landfills.

Values: Mana, whakapapa, wāhi tūpuna, mauri, utu, mahika kai and taoka

⁶⁴ Boffa Miskell (2024), *Green Island Landfill Resource Recovery Park Precinct, Ecological Impact Assessment*, Section 4.0

⁶⁵ Dunedin Section Generation District Plan, Schedule A1.2

⁶⁶ Regional Plan Water, Schedule 9 Regionally Significant Wetlands and Wetland Management Areas.

⁶⁷ Comprising approximately 85 % of the 33.8 ha saltmarsh area

⁶⁸ *Pattle Delamore Partners* (Feb 2024) *Fairfield Landfill – Technical Assessment of Effects on Groundwater, Surface Water and Ecology*, p.37 - 40.

8.4 Wāhi Tūpuna

In future there will be opportunities for public recreational use of the site and environmental enhancement, which could include planting restoration projects and new walking and biking tracks beside the Kaikarae Estuary. The aspiration of Te Rūnanga o Ōtākou is to incorporate mana whenua values and pūrākau associated with the Kaikarae Estuary in a tangible way and to restore the values of this wāhi tūpuna.

Recommendations: Wāhi Tūpuna Values

The protection of the values of wāhi tūpuna is sought by mana whenua, including:

- Protecting the full range of landscape features of significance.
- Ensuring that the interpretation of Kāi Tahu histories associated with the Kaikarae Estuary and Pukemakamaka is undertaken by Te Rūnanga o Ōtākou.
- Encouraging the use of traditional place names.

It is recommended that a co-design process is undertaken with mana whenua to incorporate mana whenua values and pūrākau associated with the Kaikarae Estuary to support the restoration of this wāhi tūpuna landscape when the landfill is returned to an unrestricted (noa) state.⁶⁹ This process may be staged reflecting the different stages of landfill closure and aftercare.

Values: Mana, Whakapapa, Rākaihautu, Matamata, Wāhi Tūpuna, Mauri, Utu, Oraka, Tapu, Tikaka, Tapatapa, Kaika, Ara Hikoi, Ara Tawhito, Mahika Kai, Taoka

⁶⁹ As discussed in Appendix 3.

9.0 He Kupu Whakamutuka: Conclusion

The mauri of the Kaikarae wetland and estuary and the associated waterways is unable to protect itself against unnatural actions and interventions such as diversions, altered flow regimes, discharges, and reclamation. This history is implicitly linked to the construction of the Fairfield and Green Island landfills on the Kaikarae wetland and estuary, and a long history of industrial discharges into the Kaikarae Stream higher up the catchment.

A collaborative process of engagement with Waste Management has enabled Te Rūnanga o Ōtākou to identify potential impacts on cultural values from the aftercare of the site, as well as potential opportunities to enhance the site and rebalance mauri. Through this assessment Te Rūnanga o Ōtākou has identified opportunities to incorporate mana whenua values and pūrākau associated with the Kaikarae Estuary in a tangible way through restoration of mauri, mahika kai and biodiversity, and through design opportunities following the staged return to noa of the Fairfield landfill site.

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Appendix 1: Glossary of Māori terms

Ahikāroa	The long-burning fires of occupation
Ara hikoī	Traditional travel routes
Ara tawhito	Ancient trails and networks of significance that provided connections to places of importance for gathering, harvesting, producing, tribal sustenance and economy. The trails connected significant sites of permanent and seasonal occupation.
Hapū	Clan, sub-tribe
Harakeke	New Zealand flax
Heke	Migration, movement
Heretaunga	Hastings
Kāi Tahu whānui	The collective hapū that make up the Kāi Tahu iwi, including the Waitaha, Kāti Māmoe, and Kāi Tahu lines of migration and settlement
Kāika mahika kai	Settlements associated with food-gathering practices
Kai	Food
Kaikarae	Correct nomenclature for the stream commonly referred to as the 'Kaikorai'
Kaitiaki / Kaitiaki whenua	Trustees, guardians recognised by mana whenua as having a mandate for environmental protection in their takiwā
Kaitiakitaka	The exercise of guardianship by the mana whenua of an area in accordance with tikaka Māori in relation to natural and physical resources, and includes the ethic of stewardship
Karae	Seabird, petrel
Kaumātua	Elders
Ki Uta ki Tai	From the mountains to the sea
Kō	Digging stick
Kōrero	Story, oral history, conversation
Mahika kai	Practices, knowledge, and activities related to food gathering, including food gathering resources and species
Mamae	Pain, distress
Mana	Influence, Authority, Prestige, Power
Mana whenua	Customary authority exercised by an iwi or hapū in an identified area, and the people mandated to exercise it on their behalf
Mātauraka	Indigenous knowledge, wisdom, skill

Maumaharataka	Memorial, memory, recollection
Mauri	Life giving force, life essence
Mokopuna	Grandchildren, descendants
Murihiku	The area of Te Waipounamu south of the Waitaki River
Noa	Free from the extension of tapu, unrestricted
Oraka	Shelter, Rest, Recuperation
Ōtepoti	Dunedin
Pātiki	Flounder
Pukemakamaka	Saddle Hill
Purehurehu	Haywards Point
Pūrākau	Stories and narratives
Rāhui	A temporary ritual prohibition, closed season, or reservation placed on an area, resource, or waterway as a conservation method
Rakatira	Chief
Rakatirataka	Chiefly authority
Takaroa	Atua or deity of the sea and fish
Takiwā	District, territory
Taoka	Treasure
Tapatapa	Protocols associated with naming
Tapu	Sacred state, Be Sacred, Prohibitive, Restrictive
Tauraka waka	Canoe mooring site
Te ao Māori	Māori worldviews
Te Kāroro	Molyneux
Te taiao	The natural environment
Tī kōuka	Cabbage tree
Tikaka	Appropriate actions, correct procedures
Tuna	Eel
Turi-makamaka	Jaffrays Hill
Tūpuna	Ancestor
Utu	Reciprocity, redressing imbalances
Wāhi mahika kai	Places where food-gathering practices were undertaken
Wāhi tūpuna	Ancestral landscape of significance to iwi
Wai	Water
Wai māori	Freshwater

Waka	Canoe
Whānau-paki	Flagstaff
Whakaari	The correct nomenclature for the place now known as ‘Wakari’
Whakapapa	Genealogy or lineage, layers. Whakapapa literally translates to ‘place in layers’ and refers to both human genealogical connections and the connections between humans and ecosystems.
Whakataukī	Proverb
Whakatipu-wai-māori	Lake Wakatipu
Whakatū	Nelson
Whanaukataka	A sense of family connection
Whenua	Land

Appendix 2: Kāi Tahu ki Otago Natural Resource Management Plan 2005

SECTION 5 OTAGO REGION TE ROHE O OTAGO	
Section 5.2 Overall Objectives	
i.	The rakatirataka and kaitiakitaka of Kāi Tahu ki Otago is recognised and supported.
ii.	Ki Uta Ki Tai management of natural resources is adopted within the Otago region.
iii.	The mana of Kāi Tahu ki Otago is upheld through the management of natural, physical and historic resources in the Otago Region.
iv.	Kāi Tahu ki Otago have effective participation in all resource management activities within the Otago Region.

Section 5.3 Wai Māori	
Section 5.3.2 Wai Māori General Issues	
• Current water management does not adequately address Kāi Tahu ki Otago cultural values. • Deteriorating water quality. Discharges: • Cumulative effects of discharges. • Discharge of human waste and other contaminants from point and non-point source discharges to water. Land Management and Use including: • Draining of wetlands. • Lack of proper riparian management throughout an entire catchment. • Sedimentation from land use and development. • Accidental discovery of cultural materials or sites from changed land use.	
Section 5.3.3 Wai Māori General Objectives	
i.	The spiritual and cultural significance of water to Kāi Tahu ki Otago is recognised in all water management.
ii.	The waters of the Otago Catchment are healthy and support Kāi Tahu ki Otago customs.
iv.	Contaminants being discharged directly or indirectly to water are reduced.
v.	Flow regimes and water quality standards are consistent with the cultural values of Kāi Tahu ki Otago and are implemented throughout the Otago Region and lower Waitaki Catchment.

Section 5.3.4 Wai Māori General Policies	
1.	To require an assessment of instream values for all activities affecting water.
2.	To promote the cultural importance of water to Kāi Tahu ki Otago in all water management within the Otago Region and Lower Waitaki Catchment.
4.	To protect and restore the mauri of all water.
<i>Discharges:</i>	
10.	To encourage all stormwater be treated before being discharged.
11.	To encourage identification of non-point source pollution and mitigate, avoid or remedy adverse effects on Kāi Tahu ki Otago values.
12.	To encourage Kāi Tahu ki Otago input into the development of monitoring programmes.
13.	To require monitoring of all discharges be undertaken on a regular basis and all information, including an independent analysis of monitoring results, be made available to Kāi Tahu ki Otago.
14.	To encourage Management Plans for all discharge activities that detail the procedure for containing spills and including plans for extraordinary events.
15.	To require all discharge systems be well maintained and regularly serviced. Copies of all service and maintenance records should be available to Kāi Tahu ki Otago upon request.
16.	To require re-vegetation with locally sourced indigenous plants for all disturbed areas. Re-vegetation should be monitored by an assessment of the vegetative cover at one growing season after establishment and again at three seasons from establishment.
17.	To require visible signage informing people of the discharge area; such signs are to be written in Māori as well as English.
18.	To require groundwater monitoring for all discharges to land.
<i>River and Instream Works:</i>	
36.	To require that any works be undertaken either before or after spawning season of potentially affected species as identified by the affected Papatipu Runaka.
37.	To require that all practical measures are taken to minimise sedimentation or discharge of sedimentation.
38.	To require that all practical measures are undertaken to minimise the risk of contamination to the waterway.
40.	To require that machinery enters the dry bed of the waterway only to the extent necessary, to carry out as much of the work as possible, using one corridor for entering and exiting.

41.	To discourage machinery operating in flowing water.
42.	To require that all machinery is clean and well maintained before entering the work site; refuelling is to be done away from the waterway.
Bank Erosion:	
44.	To encourage the planting of indigenous vegetation from the local environs to help reduce continual erosion of the edge of rivers.
Land Use and Management:	
54.	To promote land use that suits the type of land and climatic conditions.
56.	To oppose the draining of wetlands. All wetlands are to be protected.
58.	To promote integrated riparian management throughout entire catchments.
59.	To oppose the indiscriminate use of chemicals or poisons in or near waterways.

Section 5.4 Wāhi Tapu	
Section 5.4.2 Wāhi Tapu General Issues	
• Destruction and modification of wāhi tapu through the direct and indirect effects of development and resource use. • Contamination by discharges and other activities seriously erodes the cultural value and integrity of wāhi tapu. • The resurfacing of kōiwi takata through natural and human-induced processes. • Access to culturally important sites has been impeded. • Misinterpretation of the status and importance of wāhi tapu. • Inappropriate and inaccurate recording of wāhi tapu and the use of such information.	
Section 5.4.3 Wāhi Tapu Objectives	
i.	i. All wāhi tapu are protected from inappropriate activities.
ii.	Kāi Tahu ki Otago have access to wāhi tapu.
iii.	Wāhi tapu throughout the Otago region are protected in a culturally appropriate manner.
Section 5.4.4 Wāhi Tapu General Policies	
1.	To require consultation with Kāi Tahu ki Otago for activities that have the potential to affect wāhi tapu.

Earth Disturbance	
5.	To promote the use of Accidental Discovery Protocols for any earth disturbance work.
6.	To require all Māori archaeological finds to remain the cultural property of Kāi Tahu ki Otago.
Discharges	
7.	To discourage all discharges near wāhi tapu.

Section 5.5 Mahika Kai and Biodiversity	
Section 5.5.2 Mahika Kai and Biodiversity General Issues	
- Point and non-point source discharges impacting on mahika kai. - Access for Kāi Tahu ki Otago to mahika kai sites. - Customary accessibility of mahika kai species. - Loss of indigenous biodiversity in the region. - Loss of species of particular importance. - Loss of indigenous flora and fauna remnants and lack of co-ordinated management of native corridors. - Poorly managed landfills, industrial sites and waste disposal sites have created contaminated soils. Kā Papatipu Rūnaka believe that inappropriate use and development will adversely impact on: - the diversity & abundance of terrestrial and aquatic species; - the ability to access & gather mahika kai resources; and - the ability to educate future generations in significant mahika kai practices	
Section 5.5.3 Mahika Kai and Biodiversity Objectives	
i.	Habitats and the wider needs of mahika kai, taoka species and other species of importance to Kāi Tahu ki Otago are protected.
ii.	Mahika kai resources are healthy and abundant within the Otago Region.
iii.	Mahika kai is protected and managed in accordance with Kāi Tahu ki Otago tikaka.
iv.	Mahika kai sites and species are identified and recorded throughout the Otago Region.

v.	Indigenous plant and animal communities and the ecological processes that ensure their survival are recognised and protected to restore and improve indigenous biodiversity within the Otago Region.
vi.	To restore and enhance biodiversity with particular attention to fruiting trees so as to facilitate and encourage sustainable native bird populations.
ix.	To create a network of linked ecosystems for the retention of and sustainable utilisation by native flora and fauna.
5.5.4 Mahika Kai and Biodiversity General Policies	
1.	To promote catchment-based management programmes and models, such as Ki Uta Ki Tai.
4.	To require Kāi Tahu ki Otago participation in the management of mahika kai, both introduced and indigenous.
5.	To identify mahika kai sites and species of importance to Kāi Tahu ki Otago.
6.	To protect and enhance physical access for Kāi Tahu ki Otago to mahika kai sites.
7.	To require that all assessments of effects on the environment include an assessment of the impacts of the proposed activity on mahika kai.
8.	To promote the protection of remaining indigenous fish habitat by: i. Identifying waterways that exclusively support indigenous fish. ii. Prohibiting the introduction of exotic species where they currently do not exist. iii. Ensuring fish passage (both ingress and egress). iv. Removing exotic species from waterways of particular importance where this is achievable and appropriate according to Kāi Tahu ki Otago.
9.	To promote the protection of traditional breeding stocks.
10.	To encourage the transfer of knowledge through generations.
12.	To protect and enhance existing wetlands, support the reinstatement of wetlands and promote assistance for landowners for fencing-off wetlands.
15.	To promote the reintroduction of locally extinct species of importance to Kāi Tahu ki Otago to the region.
16.	To require that hazardous operations and the use, transportation and storage of hazardous substances are not to impact mahika kai and other cultural values.
18.	To promote best-practice methodologies for drain maintenance or diversions to ensure minimal damage to ecosystems with no further adverse effects on mahika kai and other cultural values.

Section 5.6 Cultural Landscapes	
Section 5.6.2 Cultural Landscapes General Issues	
• There is a prevailing view that Kāi Tahu ki Otago interests are limited to Statutory Acknowledgements, Tōpuni, and Nohoaka sites. • Land management regimes have failed to adequately provide for Kāi Tahu ki Otago interests in cultural landscapes. • Extension and maintenance of infrastructure (e.g. transport, telecommunications) can affect cultural landscapes. • The lack of use of traditional names for landscape features and sites. • Inability to address indirect and/or cumulative effects means that many issues of significance to Kāi Tahu ki Otago, such as linkages, are not addressed during resource management processes.	
Section 5.6.3 Cultural Landscapes Objectives	
i.	The relationship that Kāi Tahu ki Otago have with land is recognised in all resource management activities and decisions.
ii.	The protection of significant cultural landscapes from inappropriate use and development.
iii.	The cultural landscape that reflects the long association of Kāi Tahu ki Otago resource use within the Otago region is maintained and enhanced.
Section 5.6.4 Cultural Landscapes General Policies	
1.	To identify and protect the full range of landscape features of significance to Kāi Tahu ki Otago.
4.	To require that the interpretation of Kāi Tahu ki Otago histories for either public or commercial reasons is undertaken by the appropriate Rūnaka and/or whānau.
<i>Place names:</i>	
7.	To encourage and promote the importance of traditional place names.
8.	To promote the use of traditional place names through official name changes.
9.	To encourage consultation with Kāi Tahu ki Otago over the naming of new reserves and areas of significance.
<i>Earth Disturbance:</i>	
19.	To require all earthworks, excavation, filling or the disposal of excavated material to: i. Avoid adverse impacts on significant natural landforms and areas of indigenous vegetation; ii. Avoid, remedy, or mitigate soil instability; and accelerated erosion;

	iii. Mitigate all adverse effects.
Landfills:	
22.	To require site rehabilitation plans for land contaminated by landfills, tip sites, treatment plants, industrial waste, and agricultural waste.
23.	To require monitoring of methane levels for all closed landfills and require that analysed data be sent to (Aukaha).

Section 5.8 Coastal Environment	
Section 5.8.2 Taku Tai Moana Me Wai Māori Issues	
- Reclamation has a negative impact on water quality and flow in enclosed harbours and estuarine ecosystems. - Land use activities adjoining the coast adversely affect localised coastal water quality, for example from devegetation and poor riparian management.	
Discharge and Waste:	
Leachate from inappropriately sited landfills, casual disposal sites and potentially from landbased treatment of biosolids.	
Section 5.8.3 Taku Tai Moana Me Wai Māori Objectives	
i.	The spiritual and cultural significance of taku tai moana me te wai māori is recognised in all management of the coastal environment.
ii.	Te Tai o Arai Te Uru is healthy and supports Kāi Tahu ki Otago customs.
iii.	There is no direct discharge of human waste to Te Tai o Arai Te Uru and other contaminants being discharged directly or indirectly to the coastal environment are remedied.
Section 5.8.4 Taku Tai Moana Me Wai Māori Policies	
1.	To encourage the integrated management of the coastal environment.
5.	To discourage any further reclamation within the coastal environment.
Discharges:	
8.	To require that leachate from disposal sites adjacent to coastal environments is monitored and contaminated environments rehabilitated.
Section 5.8.6 Wāhi Tapu Issues	
Protection of: the abode of Takaroa	
5.8.7 Wāhi Tapu Objectives	

i.	Wāhi tapu are protected from inappropriate activities.
ii.	Kāi Tahu ki Otago access to sites and species of significance is protected.

Section 5.8.10 Mahika Kai (Kai Moana) & Biodiversity Issues

- Impact on coastal kai moana, associated habitats and sites from:
 - dredging and dumping
 - reclamation
 - activities occurring in the catchment
 - adjacent industrial activity as associated discharges, both point and non-point sources
- Loss of natural habitat for indigenous marine species.

5.8.11 Mahika Kai (Kai Moana) & Biodiversity Objectives

- | | |
|------|---|
| i. | The Marine Environment is managed in a holistic way. |
| ii. | Te Tai o Arai Te Uru supports the full range of healthy ecosystems and species. |
| iii. | There is an abundance of healthy kai moana. |

5.8.14 Cultural Landscapes Issues

- The cumulative effect of incremental, uncoordinated land use change and building within the coastal environment.
- Protection of cultural landscapes and seascapes such as reef systems and other sites with associated mana.
- Failure to provide for changing coastal landscapes resulting from changing sea levels.
- Reclamation impacting on cultural landscapes.
- Integrity of cultural information and interpretation pertaining to the coastal environment.

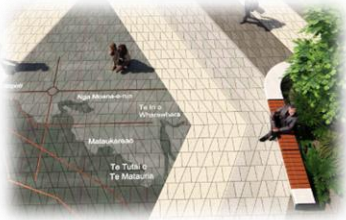
5.8.16 Cultural Landscapes Policies

- | | |
|-----|---|
| 1. | To encourage access and protection of coastal landscapes. |
| 9. | To encourage the correct use of Kāi Tahu place names associated with the coastal environment. |
| 10. | To oppose any further reclamation of the coastal marine area. |

Appendix 3: Incorporation of Mana Whenua Values through Design

The aspiration of Te Rūnanga o Ōtākou is to incorporate mana whenua values and pūrākau associated with the Kaikarae Estuary in a tangible way through design opportunities when the Fairfield Landfill site is restored to an unrestricted state. Examples of how design can reflect and provide for mana whenua values and pūrākau are outlined below but should be considered as indicative. Through a co-design process mana whenua will guide how these values and associations can be represented in a culturally meaningful way while keeping the interpretation and development in the hands of its custodians.

Values and Customary Practices	How this could be integrated	Examples
Mana	The inclusion of cultural markers such as Pou Whenua or Tohu Whenua, or significant entrances to reinstate mana whenua presence in the landscape	
Whakapapa, Rākaihautū, Matamata, Wāhi Tūpuna	Inclusion of interpretation panels to share narratives. Incorporation of quotes in low lying walls Highlighting/mapping areas that are part of Kāi Tahu traditions	
Mauri, Utu, Oraka	Riparian Planting to restore original landscapes and rebalance mauri Historical information about the site and future management for the community	
Tapu, Tikaka	Indications of restrictions with markers, panels, entrance markers. Explanation of kawa within the area – why is it restricted?	

Tapatapa	Signage and Naming Opportunities. Celebrating original names.	
Kaika, Ara Hikoi, Ara Tawhito	Highlighting narrative in pathways, panel information, wayfinding, map features	
Mahika Kai	Incorporation of visual design of important species in various elements such as paving, low lying walls, interpretation panels.	
Taoka	Features which might celebrate particular Taoka	

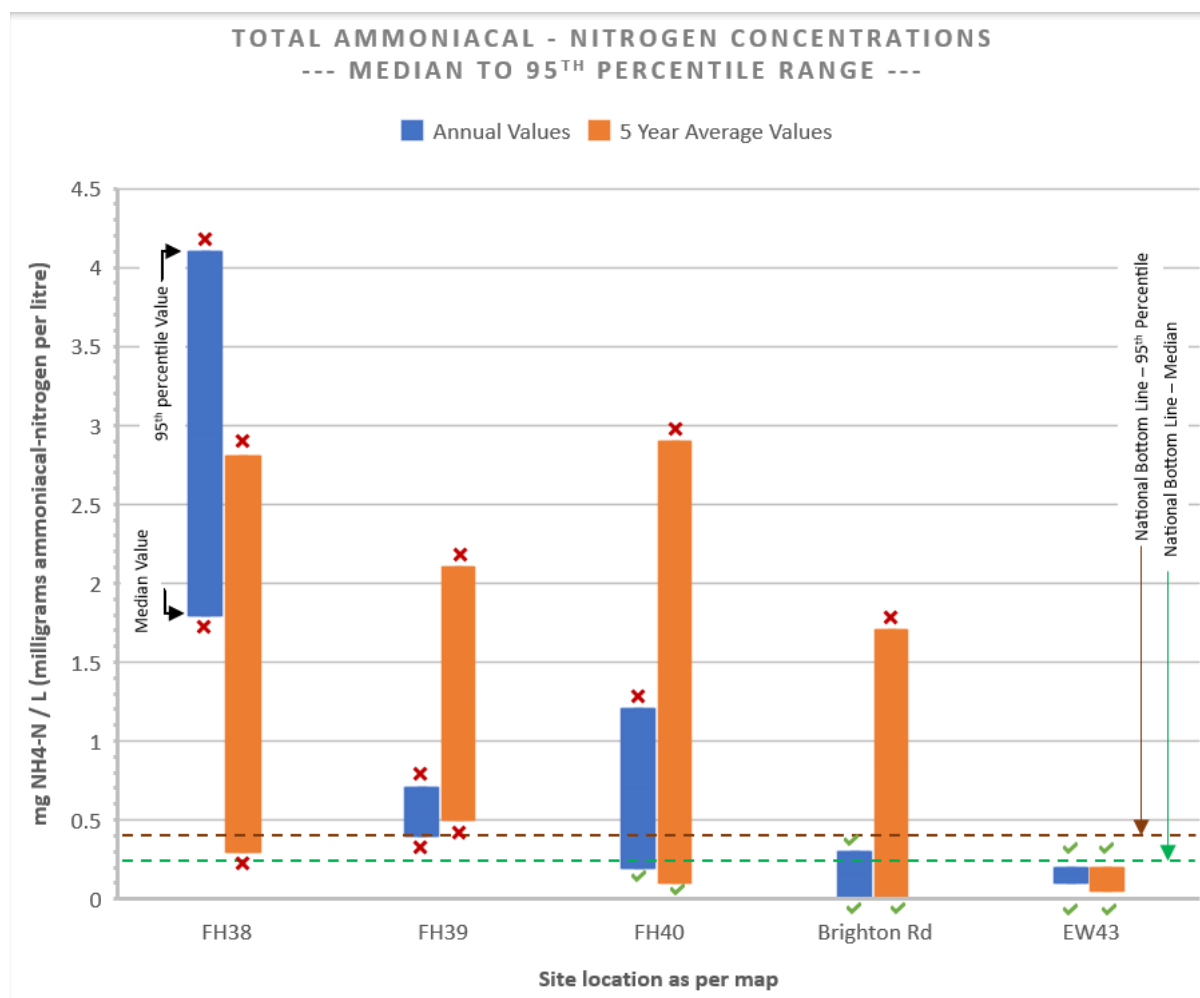
Appendix 4: Summary of Contaminant Concentrations

These summary notes are based on information presented in the report prepared by Pattle Delamore Partners (PDP): *Fairfield Landfill – Technical Assessment of Effects on Groundwater, Surface Water and Ecology* (2023). This report assesses water quality downgradient of the landfill site, with a particular focus on the impact that degraded water quality has on the estuary and mana whenua values in the area, and how this will affect future use of the area for whānau.

Three sections have been identified for further discussion with Waste Management; respectively the seepage of Total Ammoniacal Nitrogen (TAN) contaminants beyond the interception drain, the groundwater and surface water interaction, and addressing other contaminant or nutrient imbalances through the aftercare plan for the landfill. TAN contamination specifically needs to be addressed through the aftercare plan and potentially through modification of the interception trench.

TAN concentrations at monitoring sites

Table 2 and Figure 15 were of interest to Aukaha during preparation of the Cultural Impact Assessment.⁷⁰ Whakaahua 1 shows the TAN data from Table 2 alongside the NPS-FM 2020 limits for species protection (red and green dotted lines).



Whakaahua A4.1: Ammoniacal – Nitrogen Concentrations around and adjacent to site

⁷⁰ PDP Technical Assessment (2023), p.30 and Appendix A respectively.

Whakaahua A4.1 indicates the range between the median and 95th percentile TAN concentration values at all monitoring sites. The blue bars show 2022 values and the orange bars show the 5 year average (2018 -2022). Formatting the data in Table 2 data like this allowed further clarity on the water quality with respect to TAN levels at the monitoring sites.

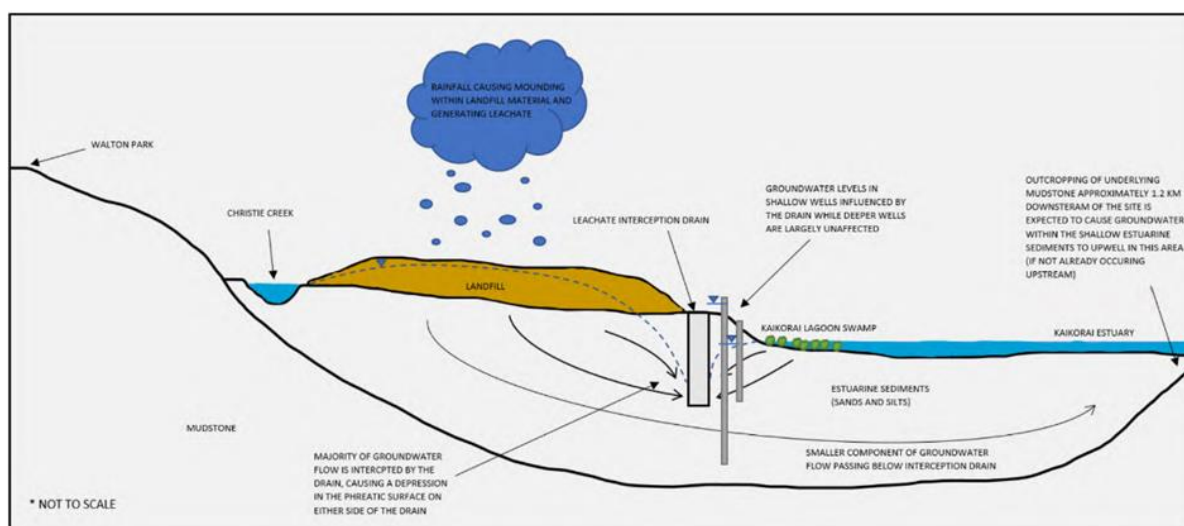
The Bottom Line limits for species protection as per the NPS-FM 2020 are shown in dotted green (Bottom Line for median) and dotted red (Bottom Line for 95th percentile). Median values above the green line or 95th percentile values above the red line represent a TAN concentration at that monitoring site which is high enough to cause regular impact on the 20 % most sensitive species, leading to reduced survival and fecundity in the wetland and its tributaries (as per the report).

Monitoring site EW43 (upstream of Fairfield Landfill, but within the Kaikarae stream) has a significantly narrower range of values and a significantly lower 95th percentile TAN value than the downstream FH40 monitoring location.

Groundwater and Surface Water interactions

The high-level model used to estimate effectiveness of the interception drain indicated that between 95.4 % and 99.4 % of the leachate was being collected. However, given the presence of much lower, but still elevated, leachate indicators in the downstream wells and the surface monitoring site (FH40), it is apparent that some leachate is entering the groundwater system and migrating beyond the interception drain. The drain does not appear to be as effective in drawing in groundwater from the deeper strata or intercepting leachate migration at depth, as evident by the elevated concentrations of TAN in deep wells LD11 and LD17.

The leachate not intercepted by the drain appears to be contributing to levels that are higher than the bottom line for species protection. Although the median annual value for FH40 is within the bottom line limit, the trend shows an increase in TAN concentration compared to the five year average.



Whakaahua A4.2: Reproduction of Conceptual Schematic of Groundwater Movement

The water quality information from wells outside of the landfill indicates that the leachate concentrations in groundwater leaving the landfill area are highly variable but appear to be higher within the deep wells on the seaward side of the interception drain. Leachate forms via decomposition of putrescible and organic elements of landfill material which are transported by water percolating through the waste profile or will form when waste is placed in saturated conditions. Both the Eastern and Western landfills appear to have been formed with little preparation works so the base of the waste is likely saturated. Groundwater mounding within the landfill areas has been identified as a

driver for lateral leachate migration towards the perimeter water bodies and vertical migration into the deeper water bearing zones.

It is currently unknown where groundwater emerges to surface water in the Kaikarae Wetland/Estuary Complex given the absence of groundwater level information below the wetland/estuary. However, based on the groundwater quality sampling undertaken within the wetland in 2012, it has been identified that leachate was impacting groundwater beneath the wetland at least to around 300 m south of the site, but it is unclear based on the data available where the groundwater and surface water interact in the area. It is also expected that some discharge could be occurring towards the east of the landfill towards Kaikarae Stream. An isotopic study undertaken in 2004 confirmed the presence of leachate in Kaikarae Stream and in plant matter (semi-aquatic grass) collected below the high-water mark in the estuary.

The 2012 investigations undertaken in the wetland area immediately downstream of the landfill did not indicate the presence of above-ground artesian water levels at that time (of low water levels) which could indicate that groundwater discharges further south of the investigation area.

Further investigation will be required to ascertain whether the leachate trench needs to be modified to further prevent the leaching of TAN and other contaminants into the estuary as part of the aftercare of the landfill. The figure included in the application (Whakaahua 2) suggests that there is groundwater flow below the interception trench that is carrying contaminants into the estuary. A deeper interception trench may be required to provide an effective barrier between the landfill and the estuary.

The effectiveness of the leachate trench and remediation should be supported by an enhanced monitoring programme. Further monitoring sites may be needed to better gauge the location of the groundwater discharge, and the remediation required to mitigate the effects of the landfill on the estuary. Alternatively, further monitoring may enable outside influences on water quality to be isolated.

Other contaminants

Several other water quality effects to factor into the aftercare programme have been summarised below. These effects, alongside the TAN concentrations, may require active remediation beyond a monitoring plan to restore the mauri of the water.

Based on monitoring data and conclusions presented in the report, it is expected that:

- aquatic organisms in Christies Creek would experience moderate DO stress, with a risk of sensitive fish and macroinvertebrates being excluded from this waterway.
- aquatic organisms below the Coal-Christies Creek convergence would experience minor DO stress.
- long-term low pH values in these two tributaries would most likely exclude sensitive aquatic organisms from these habitats. The median pH values in Kaikarae Stream and swamp were within the ANZECC (2000) DGV range, while the 95th percentile exceeded this range.
- there is significant, persistent stress on a range of aquatic biota caused by indicators exceeding tolerance levels. The NZ ETI Tool 1 ranked Kaikarae Estuary in Susceptibility Band D, Macroalgae Band D and Phytoplankton Band D. Band D ranking indicates a likelihood of local extinctions of some species and loss of ecological integrity.