Wetland Assessment at Homestead Bay, Queenstown

Contract Report No. 7483a

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Wildlands

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Contract Report No. 7483a

February 2025

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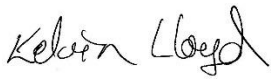

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14/02/2025

Cite this report as follows:

Wildland Consultants (2025). *Wetland Assessment at Homestead Bay, Queenstown.* Wildland Consultants Contract Report No. 7483a. Prepared for RCL Homestead Bay Limited. 51pp.

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1.0 Introduction

Remarkable Planning, on behalf of RCL Henry Downs Limited, is preparing a Fast Track resource consent application for a residential subdivision on approximately 41 hectares of rural land at Homestead Bay, just south of Jacks Point in Queenstown, Otago (Figure 1). The gently sloping site has been farmed for many decades and is largely vegetated in exotic pasture, but also contains small areas of tūmatakuru/matagouri (*Discaria toumatou*) shrublands, gullies with ephemeral streams, and possibly small natural inland wetlands. Previous aquatic and terrestrial ecology assessments have been undertaken for the site, but further assessments of natural inland wetlands are now also required.

RCL Homestead Bay Limited has commissioned Wildland Consultants Ltd (Wildlands) to identify any wetlands present and determine whether these would be exempt from the definition of a natural inland wetland under Clause 3.21(e) of the National Policy Statement for Freshwater Management (Ministry for the Environment 2020b).

2.0 Project Scope

The scope of this project includes:

- Identification of any wetlands within the proposed development.
- Determine if any wetlands present meet the definition of a natural inland wetland under Clause 3.21 of the National Policy Statement for Freshwater Management (NPS-FM; October 2024 amendments).

3.0 Relevant Legalisation

3.1 Wetland definitions

Wetlands have been defined in the Resource Management Act (RMA, 'the Act'), as outlined below.

Wetland – permanently or intermittently wet areas, shallow water, and land/water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions, including within the coastal marine area.

The National Policy Statement for Freshwater Management (NPS-FW) defines 'natural inland wetlands' as outlined below.

Natural inland wetland means a wetland (as defined in the Act) that is not:

> *(a) in the coastal marine area; or*
>
> *(b) a deliberately constructed wetland, other than a wetland constructed to offset impacts on, or to restore, an existing or former natural inland wetland; or*
>
> *(c) a wetland that has developed in or around a deliberately constructed water body, since the construction of the water body; or*
>
> *(d) a geothermal wetland; or*

Figure 1. Potential wetland areas at a proposed sub-division development at a property Homestead Bay, Otago

(e) a wetland that:

(i) is within an area of pasture used for grazing; and

(ii) has vegetation cover comprising more than 50% exotic pasture species (as identified in the National List of Exotic Pasture Species using the Pasture Exclusion Assessment Methodology (see clause 1.8)); unless

(iii) the wetland is a location of a habitat of a threatened species identified under clause 3.8 of this National Policy Statement, in which case the exclusion in (e) does not apply.

According to this definition, the pre-requisite for an area to be classified as a natural inland wetland is for the area to meet the wetland definition under the RMA, which requires both suitable hydrological conditions and presence of plants that are adapted to wet conditions, but which must not meet any of the exceptions listed above.

4.0 Methods

4.1 Desktop analysis and considerations

An initial search was undertaken on Google Earth to identify potential wetland areas to survey.

The hydrological guidance for accurate wetland delineation recommends that site inspections should be undertaken under 'normal' hydrological conditions and within the growing season for plants in the relevant region. Normal hydrological conditions require 'normal' expected rainfall for the two to three months prior to the site inspection, and for the site inspection to not be undertaken following a period of heavy rain.

The growing season for the lower areas around Queenstown starts in September and ends in May (Ministry for the Environment 2021). This survey was undertaken within the appropriate local growing season (January and February 2025).

Rainfall for January 2025 (26.8 millimetres) was significantly lower than historical average (58.1 millimetres). Rainfall for December 2024 was higher (69.8 millimetres) than the historical average of 56.1 millimetres. Rainfall for November 2024 (57.8 millimetres) was very slightly higher than the historical average of 56.5 millimetres) (Appendix 2, Metservice 2025). The dryer than normal conditions of January 2025 were taken into consideration when assessing all potential wetlands.

The soil temperature was not measured during this assessment. Soil temperature is taken to enable the determination of the growing season. However, the growing season was determined by using the guidelines in the Wetland Hydrology Tool (Ministry for the Environment 2021).

4.2 Field survey

Site investigations were undertaken on 30 January, 3 and 4 February 2025 to assess potential wetlands. Wetland vegetation types were classified and described following the structural classes outlined in Atkinson (1985). Wetland types were classified and described following the classification outlined in Johnson and Gerbeaux (2004).

4.3 Wetland assessment

Part 1: Assess wetland status under the RMA

To define whether a wetland meets the RMA definition of a wetland, the Part 1 assessment within the defining 'natural wetlands' and 'natural inland wetlands' guidance document needs to be undertaken (Ministry for the Environment 2021). This assessment can also help define the extent of any wetland present.

The New Zealand vegetation tool for wetland delineation (Clarkson 2013) has become the standard methodology to assess the presence of plants adapted to wet conditions. This methodology classifies all plant species recorded in wetlands into five categories.

- OBL: Obligate. Almost always is a hydrophyte, rarely in uplands (estimated probability >99% occurrence in wetlands).
- FACW: Facultative Wetland. Usually is a hydrophyte but occasionally found in uplands (estimated probability 67-99% occurrence in wetlands).
- FAC: Facultative. Commonly occurs as either a hydrophyte or non-hydrophyte (estimate probability 34-66% occurrence in wetlands).
- FACU: Facultative Upland. Occasionally is a hydrophyte but usually occurs in uplands (estimated probability 1-33% occurrence in wetlands).
- UPL: Obligate Upland. Rarely is a hydrophyte, almost always in uplands (estimated probability <1% occurrence in wetlands).

Species that are classed as OBL, FACW, or FAC are considered hydrophytic and generally indicative of wetland habitat. The relative dominance of each species and corresponding classification can therefore determine whether an area should be defined as a wetland. In the instance, that a plant species present does not have a wetland indicator status, it given the UPL status (Clarkson *et al.* 2021).

In accordance with the methods described in the wetland delineation protocols (Clarkson 2021, Ministry for the Environment 2020, Ministry for the Environment 2021, Ministry for the Environment 2022 and Fraser *et al.* 2013), in areas of potential wetland, the following methods were applied:

- Firstly, the Rapid wetland test was completed. For this test to confirm the area as a wetland, all dominant species must be either OBL or FACW species. If the Rapid Wetland test failed, additional hydrophytic vegetation tests are required.
- Two tests are required for the hydrophytic vegetation determination (Dominance test and Prevalence index). Representative plots (2 metre × 2 metre for herb strata, 5 metre radius circular plot for shrub strata and 10 metre circular plot for tree/forest strata) where established in different vegetation types and geomorphic positions across the site. In each plot, the species in each stratum were identified and percent cover estimated (i.e. tree, sapling/shrub, herb). Species hydrophytic categories were taken from Manaaki Whenua (2021) and the dominant species were noted. For the Dominance test to confirm the area as a wetland, >50% of the dominant species must be OBL, FACW or FAC and all/most dominant species must not be FAC.
  - For the Prevalence Index (PI) test, a plot-based algorithm derived from the unique combination of OBL–UPL plants and their cover is calculated. The vegetation is hydrophytic (wetland) if PI ≤ 3.0, but values around 3.0 can also be considered wetlands when other wetland indicators indicate wetland presence.
  - If the Dominance, and Prevalence tests failed to identify the area as a wetland, then indicators of hydric soils and wetland hydrology were taken to determine if there was wetland hydrology

present. If one of the hydrophytic vegetation tests passed and the other failed or if the result was uncertain (PI = 3.0 or Dominance test = 50%), further assessment is required.

- Methods for the soil assessment to determine hydric soils were taken from Fraser *et al.* (2013). The simple flow key (Figure 19) was followed to determine hydric soil features or other soil (or uncertain soil).

- Methods for the hydrology assessment were taken from Ministry for the Environment (2021). Wetland hydrology is determined by the presence or absence of hydrological indicators. Wetland hydrology indicators are assembled into four groups: 1) observation of flooding or groundwater; 2) evidence of flooding or ponding; 3) soil saturation; 4) landscape, vegetation and soil observations. Group 1 are primary indicators and Groups 2 to 4 have a mix of primary and secondary indicators. The presence of one primary indicator, or two secondary indicators, confirms the presence of a wetland.

- If the hydric soils and wetland hydrology tests are passed, then the definition of a wetland is met for the site under the Resource Management Act (RMA), but may not pass under the National Policy Statement for Freshwater Management (NPS-FM). If the hydric soils fail and the wetland hydrology pass, then this is also defined as a wetland. If the hydric soils pass and the wetland hydrology fail, then the area is a drained wetland or atypical environmental conditions are present. A site assessment is needed to determine the status in the latter case.

Part 2: Assessing whether a wetland is a 'natural wetland' or 'natural inland wetland' under the NPS-FM

Once a wetland has been defined under the RMA, further assessment is needed to define whether a 'wetland' is a 'natural wetland' or a 'natural inland wetland'. The Part 2 assessment was followed within the defining 'natural wetlands' and 'natural inland wetlands' guidance document (Ministry for the Environment 2021). Exotic pasture species are noted from the National list of exotic pasture species document by Cosgrove *et al.* 2022.

5.0 Potential wetland areas

5.1 Overview

RCL Homestead Bay Limited and Remarkable Planning identified two areas of potential wetlands (Wet Area 1 and 2). An initial and brief google earth analysis was undertaken at the proposal phase of this project and another possible five wetlands were identified (Wet Areas 3-5). Three of these potential wetlands are likely to be ephemeral wetlands due to their shape and geographic position which can be seen aerially on google earth. During the field survey, another area was also suspected to be a wetland (Wet Area 6). A total of eight areas were assessed for potential wetlands (Figure 1 and Table 1). Plant species recorded within the Wet Areas are listed in Appendix 1.

All potential wetland areas identified are currently within grazed pasture (improved pasture). The clause in the NPS-FM that concludes that a wetland that 'is within an area of pasture used for grazing' is not a natural inland wetland does not apply to these potential wetland areas as it is being proposed for residential development.

Table 1 – Wetland delineation results summary for potential wet areas identified at Homestead Bay, Otago.

Wet Area Number	Plot Number	Hydrophytic Vegetation Test				Hydric Soils	Hydrology	RMA Wetland	Is it Dominated by (>50%) Exotic Pasture Species?	NPS-FM Natural Inland Wetland
		Rapid Test	Dominance Test	Prevalence Index	Hydric Vegetation					
Wet Area 1	Plot 1	Fail	Pass (67%)	Pass (2.67)	Yes	Yes	Yes	Yes	Yes (59%)	Yes
	Plot 2	Fail	Uncertain (50%)	Fail (3.91)	No	Not assessed	Not assessed	No	-	No
	Plot 3	Fail	Pass (100%)	Pass (2.20)	Yes	Not assessed	Not assessed	Yes	No (37%)	Yes
Wet Area 2	Plot 4	Pass	Pass (100%)	Pass (2.0)	Yes	Not assessed	Not assessed	Yes	No (0%)	Yes
	Plot 5	Fail	Fail (33%)	Fail (3.13)	No	Yes	No	No	-	No
	Plot 6	Fail	Uncertain (50%)	Fail (3.36)	No	Not assessed	Not assessed	No	-	No
	Plot 7	Fail	Fail (33%)	Fail (3.07)	Uncertain	Uncertain	No	No	-	No
Wet Area 3	Plot 8	Fail	Fail (0%)	Fail (3.99)	No	Not assessed	Not assessed	No	-	No
	Plot 9	Fail	Uncertain (50%)	Fail (3.86)	Uncertain	Yes	Yes	Yes	No (3%)	Yes
Wet Area 4	Plot 10	Fail	Uncertain (50%)	Pass (2.26)	Yes	Uncertain	Yes	Yes	No (32%)	Yes
	Plot 11	Fail	Fail (0%)	Fail (4.15)	No	Not assessed	Not assessed	No	-	No
	Plot 12	Fail	Fail (0%)	Fail (4.09)	No	Not assessed	Not assessed	No	-	No
Wet Area 5	Plot 13	Fail	Fail (0%)	Fail (4.91)	No	No	No	No	-	No
Wet Area 6	Plot 14	Fail	Not assessed (no vegetation present)	Not assessed (no vegetation present)	No	Uncertain	Yes	Yes	Not assessed (no vegetation present	Yes
	Plot 15	Fail	Fail (0%)	Fail (4.54)	No	Not assessed	Not assessed	No	-	No
Wet Area 7	No plot assessment	Pass	-	-	Not assessed	Not assessed	Not assessed	Yes	-	No
Wet Area 8	No plot assessment	-	-	-	Not assessed	Not assessed	Not assessed	No	-	No

5.2 Wet Area 1

Wet Area 1 is at the northern end of the property and consists of mainly exotic pasture grassland and features a pond, a very small gully, rushlands and an area of pugged bare soils.

Plot 1

The rapid test included Yorkshire fog (*Holcus lanatus*; FAC), browntop (*Agrostis capillaris*; FACU), soft rush (*Juncus effusus*; FACW) and sharp spike sedge (*Eleocharis acuta*; OBL) as the dominant species and resulted in a 'failed' result. Due to the failed result of the rapid test more hydrophytic vegetation assessments were required. Plot 1 was placed within the soft rush and sharp spike sedge rushland (Plate A3-1). The vegetation assessment within this plot, resulted in hydrophytic vegetation being present (Dominance Test = 67%; Prevalence Index = 2.67). Both hydrophytic vegetation tests passed and technically no further wetland tests such as soils and hydrology are necessary. As this, was the first wetland assessment on the property soils and hydrology tests were performed to gain a better understanding of the soils in the area. As expected, these assessments recorded hydric soils and wetland hydrology features being present.

This plot is within a soft rushland that occurs on a slight slope above a pond (Plate A3-16). It is unknown if the pond has been artificially made. It may have historically been a wetland but after many years of farming is now consistently a pond. The pond is just visible in a Retolens image on the 22 April 1964 (SN1641). The pond is consistently inundated, visible in Google Earth from 1 August 2006 to present day. If the pond has been artificially made then the rushland is not a 'natural inland wetland' as it has developed around a deliberately constructed water body (Clause 'c'. within the RMA definition of a natural inland wetland). However, there is no found evidence that this pond has been artificially made and the pond was likely to have been a wetland historically. Therefore, this rush is a natural inland wetland.

Plot 2

The rapid test included Yorkshire fog (FAC), Californian thistle (*Cirsium arvense*; FACU), shepherds purse (*Capsella bursa-pastoralis*; no wetland status, so updated to UPL) and sweet vernal (*Anthoxanthum odoratum;* FACU) as the dominant species and resulted in a 'failed' result. Due to the failed result of the rapid test more hydrophytic vegetation assessments were required. This area contained two small areas of concave, mostly unvegetated soil that had some pugging within it (Plate A3-2). The vegetation assessment for this plot resulted in the Dominance Test (50%) and Prevalence Test (3.91) failing. No further testing was done. This area is not a wetland.

Plot 3

The rapid test included Yorkshire fog (FAC), soft rush (FACW), and floating sweetgrass (*Glyceria fluitans*; OBL) as the dominant species and resulted in a 'failed' result. Due to the failed result of the rapid test more hydrophytic vegetation assessments were required. This plot was placed in a wet channel containing mostly soft rush, Yorkshire fog (*Holcus lanatus*) and floating sweetgrass (*Glyceria declinata*) (Plate A3-3). The vegetation assessment for this plot passed the vegetation test (Dominance Test = 100%; Prevalence Index = 2.20), and contains hydrophytic vegetation. No further testing was necessary and this area is considered a natural inland wetland.

5.3 Wet Area 2

Wet Area 2 is near the southern end of the property and lays just above one of the gullies. This area consists of exotic pasture grassland, rushlands and a concave oval hollow.

Plot 4

The rapid test included kneed foxtail (*Alopercurus geniculatus*; FACW) and *Lobelia perpusilla* (FACW) as the dominant species and resulted in a 'passed' result. According to the Wetland Delineation Protocols, no more assessments are required and this area can be considered as a natural inland wetland. However, more hydrophytic vegetation tests were undertaken to ensure a thorough assessment was performed. Plot 4 was placed in a concave oval hollow with abundant kneed foxtail and patches of *Lobelia perpusilla* (Plate A3-4). This plot resulted in a hydrophytic vegetation being present by passing both vegetation tests (Dominance Test = 100%, Prevalence Index = 2.0), therefore this area is a wetland. No further soil and hydrology assessments were required for this plot. This wet area is a natural inland wetland.

Plot 5

South of the concave hollow, is a leafless/wīwī rush (*Juncus australis*) rushland. The rapid test included wī/leafless rush (*Juncus australis*; FACW), browntop (FACU), and ryegrass (*Lolium perenne*; FACU) as the dominant species and resulted in a 'failed' result. Due to the failed result of the rapid test more hydrophytic vegetation assessments were required. Plot 5 was placed within the rushland (Plate A3-5). Vegetation assessments resulted in a fail (Dominance Test = 33%, Prevalence Test = 3.13). However, because the prevalence test was marginal, a soil and hydrology assessment were also undertaken. The soil assessment resulted in hydric soils and the hydrology assessment failed. According to the Wetland Delineation Protocols (Ministry for the Environment 2022), this would mean that this is a drained wetland or atypical environment and further analysis is required. After re-reviewing Google Earth historic imagery and marginal assessment outcomes, it is concluded that this area is not a natural inland wetland.

Plot 6

North of the concave oval hollow, is a very small soft rushland on a slope (Plate A3-6). Within the rushland is a shallow drain. The rapid test included soft rush (FACW), white clover (*Trifolium repens*; FACU) and browntop (FACU) as the dominant species and resulted in a 'failed' result. Due to the failed result of the rapid test more hydrophytic vegetation assessments were required. This plot failed both of the vegetation tests (Dominance Test = 50%, Prevalence Index = 3.36), and is therefore not a wetland.

Plot 7

Another plot was undertaken within the same vegetation area of Plot 5 to try and give more clarity to this area (Plate A2-7). The rapid test included wīwī/leafless rush (FACW), white clover (FACU) and browntop (FACU) as the dominant species and resulted in a 'failed' result. Due to the failed result of the rapid test more hydrophytic vegetation assessments were required. The vegetation assessments results were similar to Plot 5 and resulted in a marginal fail for the Prevalence Index (Dominance Test = 33%, Prevalence Index = 3.07). The soil assessment resulted in uncertain hydric soils and the hydrology assessment failed. It is concluded that this area is not a wetland.

5.4 Wet Area 3

Wet Area 3 is north east of Wet Area 2 and covers an area of exotic pasture grassland and minor undulating land.

Plot 8

The rapid test included ryegrass (FACU) and white clover (FACU) as the dominant species and resulted in a 'failed' result. Due to the failed result of the rapid test more hydrophytic vegetation assessments

were required. Plot 8 was placed in a flat area in a slight depression that is covered in exotic herbs and grasses (Plate A3-8). The vegetation tests both failed for this plot (Dominance Test = 0%, Prevalence Index = 3.99). No further assessments were done for this plot and is concluded that it is a dryland habitat and not within a wetland.

Plot 9

A deeper oval depression is present just northeast of the above area (Plate A3-2). The rapid test included swamp plantain (*Plantago australis*; FAC), nettle (*Urtica urens*; no wetland status, updated to UPL) and fathan (*Chenopodium album*; no wetland status, updated to UPL) as the dominant species and resulted in a 'failed' result. Due to the failed result of the rapid test more hydrophytic vegetation assessments were required. The vegetation assessment for this plot resulted in uncertain results, with a Dominance Test of 50% and a Prevalence Index of 3.86. More tests (soil and hydrology) were undertaken to further investigate the wetland assessment. The soil profile presented several signs of hydric soil characteristics. The hydrology assessment also contained several indicators such as being sparsely vegetated concave surface (2H; primary indicator), saturation in aerial imagery (3F; secondary indicator) and geomorphic position (4B; secondary indicator). Plot 9 is within a wetland and can be also classed as a natural inland wetland.

5.5 Wet Area 4

Wet Area 4 is at the southern end of the property and occurs just above one of the larger gullies. This area consists of exotic pasture grassland, rushlands, a concave oval hollow and undulating land.

Plot 10

Another deep oval depression is present at the southern end of the property (Plate A3-10). The rapid test included floating sweetgrass (OBL), browntop (FACU) and clammy goosefoot (*Dysphamia pumilio*; no wetland status, updated to UPL) as the dominant species and resulted in a 'failed' result. Due to the failed result of the rapid test more hydrophytic vegetation assessments were required. The vegetation assessment resulted in uncertain results, with a Dominance Test of 50% (fail) and a Prevalence Index of 2.26 (pass). More tests (soil and hydrology) were undertaken to further investigate the wetland assessment. The soil profile presented several signs of hydric soil characteristics. The hydrology assessment had similar results as Plot 9 and also contained several indicators to confirm wetland hydrology being present. Plot 10 is within a wetland and can be classed as a natural inland wetland.

Plot 11

Adjacent to the oval depression above is a small flat area with minimal vegetation (Plate A2-11). The rapid test included Scotch thistle (*Cirsium vulgare*; FACU), ryegrass (FACU), and annual poa (*Poa annua*; FACU) and fathen (no wetland status, updated to UPL) as the dominant species and resulted in a 'failed' result. Due to the failed result of the rapid test more hydrophytic vegetation assessments were required. This plot failed both of the vegetation tests (Dominance Test = 0%, Prevalence Index = 4.15) and is a dryland area and not a natural inland wetland.

Plot 12

This plot is within a small undulation to the north of the large deep oval depression (Plot 10) (Plate A2-12). The rapid test included Californian thistle (FACU) and ryegrass (FACU) as the dominant species and resulted in a 'failed' result. Due to the failed result of the rapid test more hydrophytic vegetation assessments were required. This plot failed both vegetation tests (Dominance Test = 0%, Prevalence Index = 4.09) and is a dryland area and not a wetland.

5.6 Wet Area 5

Wet Area 5 is a small area that is within the start of the small gully. The area consists of exotic pasture grassland and sweet briar (*Rosa rubiginosa*).

Plot 13

This plot is at the bottom of a small mostly unvegetated gully (Plate A3-13). The rapid test included shepherd's purse (no wetland status, updated to UPL), nettle (no wetland status, updated to UPL) and ryegrass (FACU) as the dominant species and resulted in a 'failed' result. Due to the failed result of the rapid test more hydrophytic vegetation assessments were required. This plot failed both of the vegetation tests (Dominance Test = 0%, Prevalence Index = 4.91) and is a dryland area and not a natural inland wetland.

5.7 Wet Area 6

This potential wetland is a flat to shallow mostly unvegetated oval depression. Only a small area had pugging and surface soils cracks nearby the fenceline. The rest of the area had compacted soils and sparse exotic herbs and grasses around the edges. Unvegetated areas within paddocks can also be caused from having more intense congregation from stock. However, since the area was in a depression and showed some hydrological indicator signs, the area was assessed.

Plot 14

The rapid test included fathen (no wetland status, updated to UPL), dwarf mallow (*Malva neglecta*; no wetland status, updated to UPL), white clover (FACU) and ryegrass (FACU) as the dominant species and resulted in a 'failed' result. Due to the failed result of the rapid test more hydrophytic vegetation assessments were required. Plot 14 was placed within the small pugged area of the lowest part of the mild depression (Plate A3-14). This area was a difficult assessment as no plant species were within the plot, meaning that the vegetation assessment could not be undertaken. The soil profile contains some low chroma colours and iron concretions that are suggestive of potential hydric soils. The topsoil chroma is 3/2, and any topsoils 3 or less are not good indicators of hydric soils as many topsoils have this colour range (Fraser *et al*. 2018). This soil profile has an outcome of 'uncertain' soils. The hydrology assessment contained indicators such as being sparsely vegetated concave surface (2H; primary indicator), saturation in aerial imagery (3F; secondary indicator) and geomorphic position (4B; secondary indicator). According to the Wetland Delineation Protocols (Ministry for the Environment), if the soil assessment fails (uncertain here), and the hydrology passes (this area contains one primary indicator and also two secondary hydrology indicators), then this area is a wetland. This area is likely to be a very recent natural inland wetland.

Plot 15

The rapid test included fathen (no wetland status, updated to UPL), dwarf mallow (no wetland status, updated to UPL), white clover (FACU) and ryegrass (FACU) as the dominant species and resulted in a 'failed' result. Due to the failed result of the rapid test more hydrophytic vegetation assessments were required. A plot was placed on the upper edge of the depression where the soil was compacted and contained a few sparse exotic herbs and shrubs (Plate A3-15). Both vegetation assessments failed for this plot (Dominance Test = 0%, Prevalence Index = 4.54). This area is not a natural inland wetland.

5.8 Wet Area 7

Wet Area 7 is a large area that has possibly been dug out and contains an island in the middle (Plate A3-17 and A3-18). This area may have historically been a wetland but was modified by the landowner.

Google Earth images from 1 August 2006, suggests that the modification may have occurred around this date.

The large hole has steep sides with exotic pasture species. The bottom on the hole contains a herbfield of marsh bedstraw (*Galium palustre* subsp. *palustre;* OBL), sharp spike sedge (OBL), kneed foxtail (FACW), waoriki (*Ranunculus glabrifolius;* OBL) and Shepard's purse (no wetland status). The dominate species present (marsh bedstraw, sharp spike sedge, kneed foxtail and waoriki) all have a wetland status of either FACW and OBL. This area passes the rapid test and is considered a wetland under the RMA. This wetland is excluded from the 'natural wetland' definition because it has been formed in a constructed excavation and was likely intended to be a pond (currently dry).

5.9 Wet Area 8

This area covers undulating land covered in exotic pasture grassland and a terrace. One area at a low point within the undulating land looked to may have contained water-logging in the initial and brief look at historic Google Earth images. This area contains consistent, well-covered exotic pasture species that are mostly Facultative Upland or Upland species (dryland species).

The other area considered to be worth checking out after the initial and brief look at historic Google Earth images was a low-lying area at the bottom of the shrubland terrace. This area contained species that are all Facultative Upland species such as porcupine shrub (*Melicytus alpinus*), barley grass (*Hordeum murinum* subsp. *murinum*), cocksfoot (*Dactylus glomerata*) and Scotch thistle (*Cirsium vulgare*). The other species present such as burdock (*Arctium lappa*), dovesfoot cranesbill (*Geranium molle*), nettle and dwarf mallow do not have a wetland status but all are likely to be Facultative Upland or Upland species (dryland species). The dominance of dryland vegetation species and the lack of any hydrology features leads to the conclusion that this area is a dryland.

6.0 Natural inland wetlands

6.1 Overview

Six natural inland wetlands have been identified at the Homestead Bay property proposed for development (Figure 2). The natural inland wetlands are small in size and are predominantly dominated by exotic plant species. Three classes of natural inland wetlands (marsh, swamp and ephemeral) are present at the Homestead Bay property. Despite, the exotic plant dominance the wetlands are still valuable in their ability to be a carbon sink and providing habitat for indigenous bird and invertebrates species, in particular wading birds such as pūkeko (*Porphyrio melanotus;* Not Threatened).

Four of natural inland wetlands present are ephemeral wetlands. Ephemeral wetlands are typically in closed depressions and contain low statue plant species that are often arranged in a zonation pattern. This type of wetland has unique hydrology characteristics by being intermittently inundated throughout the year. Typical hydrology of an ephemeral wetland is usually ponded during winter/spring, with the water level gradually lowering in summer (Johnson and Rogers 2003). Ephemeral wetlands are ecologically valuable as they can contain a diverse range of plant species, host a high proportion of uncommon and threatened plants (Johnson and Rogers 2003) and provide habitat for wading indigenous birds. Ephemeral wetlands threatened by many factors including human-induced modifications, sedimentation, nutrient enrichment, pollutants, trampling impacts from mammals, weed invasions and introduced fish (Johnson and Rogers 2003). Ephemeral wetlands are a critically endangered naturally uncommon ecosystem in New Zealand (Holdaway *et al*. 2012)

1. Soft rush-browntop-sharp spike sedge rushland marsh (0.0419 hectares)

Clusters of soft rush are spread throughout a mosaic of browntop, sharp spike sedge and Yorkshire fog (Plate 1). Other species occasionally present include white clover, wīwī/leafless rush and jointed rush (*Juncus articulatus*). A sedge species is also present in very low abundance. The sedge did not have an inflorescence to confirm identification but is likely Sinclair's sedge (*Carex sinclairii*), due to its leaf characteristics[1] and habitat match.

Plate 1 – Rushland marsh wetland above the pond in Wet Area 1 at Homestead Bay. 30 January 2025.

2. Soft rush-floating sweet grass-Yorkshire fog grassland swamp (0.0087 hectares)

This swamp wetland lays in a channel that sits below the pond in Wet Area 1 (Plate 2). The swamp wetland contains a mosaic of soft rush, Yorkshire fog, floating sweetgrass, curled dock (*Rumex crispus*) and jointed rush. The wetland contains the occasional clusters of water fern (*Azolla rubra*) sitting on the water surface.

3. Kneed foxtail-*Lobelia perpusilla* grassland ephemeral wetland (0.0372 hectares)

This ephemeral wetland is located in the middle of the Wet Area 2 and is a concave hollow that is lined with soft rush on the northern end and leafless/wīwī rush on the southern end (Plate 3). The ephemeral wetland contains abundant kneed foxtail with common patches of the indigenous herb *Lobelia perpusilla*.

[1] Double folded leaf, leaf width of 4-4.5 millimetres, leaf length of *c.* 40 centimetres and light yellow-green leaf colouration.

Figure 2. Natural inland wetlands at a proposed sub-division development at a property Homestead Bay, Otago

Plate 2 – Rushland swamp wetland below the pond in Wet Area 1 at Homestead Bay. Plot 3 can be seen within the wetland. 30 January 2025.

Plate 3 – Ephemeral wetland surrounded by rushlands in the middle of Wet Area 2 at Homestead Bay. 30 January 2025.

4. [Swamp plantain] herbfield ephemeral wetland (0.0130 hectares)

Another ephemeral wetland is located in Wet Area 3. This wetland is within an oval depression and is mostly unvegetated (Plate 4). A few exotic species are scarce and scattered near the edges and include: marsh plantain, ryegrass, nettle and clammy goosefoot.

Plate 4 – Ephemeral wetland within the exotic pasture grassland within Wet Area 3 at Homestead Bay. 30 January 2025.

5. [Floating sweetgrass-kneed foxtail-clammy goosefoot] grassland ephemeral wetland (0.0289 hectares)

This ephemeral wetland is also within a mostly unvegetated oval depression (Plate 5). Scarce and scattered exotic species located near the edges of the wetland include floating sweetgrass, browntop, clammy goosefoot, white clover, and black nightshade (*Solanum nigrum*).

6. Mudflat ephemeral wetland (0.0105 hectares)

This unvegetated ephemeral wetland is lies in a small depression and is very small in size. This area is likely a recently developed wetland, as suggested by the 'uncertain' soil result in the guidelines (Fraser *et al.* 2018). The first evidence of water pooling in this wetland on Google Earth can only be seen from 10 February 2010. The ephemeral wetland is at the lowest point (paler soil) of a compacted open soil patch (Plate 6).

Plate 5 – Ephemeral wetland within the exotic pasture grassland within Wet Area 4 at Homestead Bay. 3 February 2025.

Plate 6 – Ephemeral wetland within the exotic pasture grassland within Wet Area 6 at Homestead Bay. 4 February 2025.

7.0 Summary

Eight areas were investigated for the possibility of wetlands being present. A total of six natural inland wetlands were identified within the property at Homestead Bay proposed for a sub-division development. The marsh and swamp wetlands are dominated by exotic species, with soft rush being the most common species present. The ephemeral wetlands are mostly dominated by exotic plant species, nonetheless still contain typical characteristics of their ecosystem type. These natural inland wetlands will likely provide habitat to indigenous bird and invertebrate species. The ephemeral wetlands are particularly ecologically valuable due their potential to host diverse plant species as well as uncommon and threatened plant species. Ephemeral wetlands are a unique and uncommon habitat and has been listed as a critically endangered ecosystem. All wetland present are important on a national scale as New Zealand has lost 90% of its pre-human wetland extent, making wetlands the most nationally threatened ecosystem type (Aussiel *et al.* 2008).

The residential development could consider avoiding these wetlands and incorporating them into their reserve areas. All wetlands would benefit from enhancement actions such as indigenous plantings (around the wetland margin for the ephemeral wetlands), weed control and cattle exclusion. Light grazing from sheep can be beneficial for ephemeral wetlands as they discourage woody weed species and encourage low-statue turf communities that are typical for this type of wetland ecosystem.

Acknowledgments

Amanda Leith (Planner/Director of Remarkables Planning) is thanked for providing useful information and site access. Farm Managers Dave Atkin and Matt Little are thanked for allowing access to the active farm areas.

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Appendix 1

Plant species recorded and their wetland indicator status[2]

Species	Common Name	Threat Status[3]	Status	Wetland Indicator Status
Achillea millefolium	Yarrow	-	Exotic	FACU
Agrostis capillaris	Browntop	-	Exotic	FACU
Alopecurus geniculatus	Kneed foxtail	-	Exotic	FACW
Anthoxanthum odoratum	Sweet vernal	-	Exotic	FACU
Arctium lappa	Burdock	-	Exotic	None
Azolla rubra	Pacific azolla, azolla, red azolla	Not Threatened	Indigenous Non-Endemic	None
Capsella bursa-pastoris	Shepherds purse		Exotic	None
Carex sp.[4]	Sedge	Not Threatened	Indigenous Non-Endemic	None
Carex sp.	Sedge	-	Indigenous Non-Endemic	None
Cerastium glomeratum	Chickweed	-	Exotic	FACU
Chenopodium album	Fathen	-	Exotic	None
Cirsium arvense	Californian thistle	-	Exotic	FACU
Cirsium vulgare	Scotch thistle	-	Exotic	FACU
Cynosurus cristatus	Crested dogstail	-	Exotic	UPL
Dactylis glomerata	Cocksfoot	-	Exotic	FACU
Dysphania pumilio	Clammy goosefoot	-	Exotic	None
Eleocharis acuta	Spike sedge	Not Threatened	Indigenous Non-Endemic	OBL
Erodium cicutarium	Storksbill	-	Exotic	None
Galium palustre	Marsh bedstraw	-	Exotic	OBL
Geranium molle	Dovesfoot cranesbill	-	Exotic	None
Glyceria fluitans	Floating sweetgrass	-	Exotic	OBL
Holcus lanatus	Yorkshire fog	-	Exotic	FAC
Hordeum murinum	Barley grass	-	Exotic	FACU
Hypericum humifusum	Trailing Saint John's wort	-	Exotic	FAC
Hypochaeris radicata	Catsear	-	Exotic	FACU
Juncus articulatus	Jointed rush	-	Exotic	FACW
Juncus australis	Wīwī, wī, leafless rush	Not Threatened	Indigenous Non-Endemic	FACW
Juncus effusus	Soft rush	-	Exotic	FACW
Juncus tenuis subsp. dichotomus		-	Exotic	FACW
Leontodon saxatilis	Hawkbit	-	Exotic	FAC
Lobelia perpusilla		Not Threatened	Indigenous Endemic	FACW
Lolium perenne	Ryegrass	-	Exotic	FACU

[2] Any species with a 'none' status was changed to a 'OBL' status in the assessment.
[3] de Lange *et al*. 2024
[4] Likely *Carex sinclairii*

Species	Common Name	Threat Status[3]	Status	Wetland Indicator Status
Malva neglecta	Dwarf mallow	-	Exotic	None
Melicytus alpinus	Porcupine shrub	Not Threatened	Indigenous Endemic	FACU
Plantago australis	Swamp plantain	-	Exotic	FAC
Poa annua	Annual poa	-	Exotic	FACU
Ranunculus glabrifolius	Waoriki	Not Threatened	Indigenous Non-Endemic	OBL
Rumex crispus	Curled dock	-	Exotic	FAC
Rumex obtusifolius	Broad-leaved dock	-	Exotic	FAC
Sagina procumbens	Pearlwort	-	Exotic	FACU
Solanum nigrum	Black nightshade	-	Exotic	FACU
Sonchus asper	Prickly puha	-	Exotic	FACU
Spergula arvensis	Spurrey	-	Exotic	None
Taraxacum officinale	Dandelion	-	Exotic	FACU
Trifolium repens	White clover	-	Exotic	FACU
Urtica urens	Nettle	-	Exotic	None
Verbascum thapsus	Woolly mullein	-	Exotic	None
Verbascum virgatum	Moth mullein	-	Exotic	None

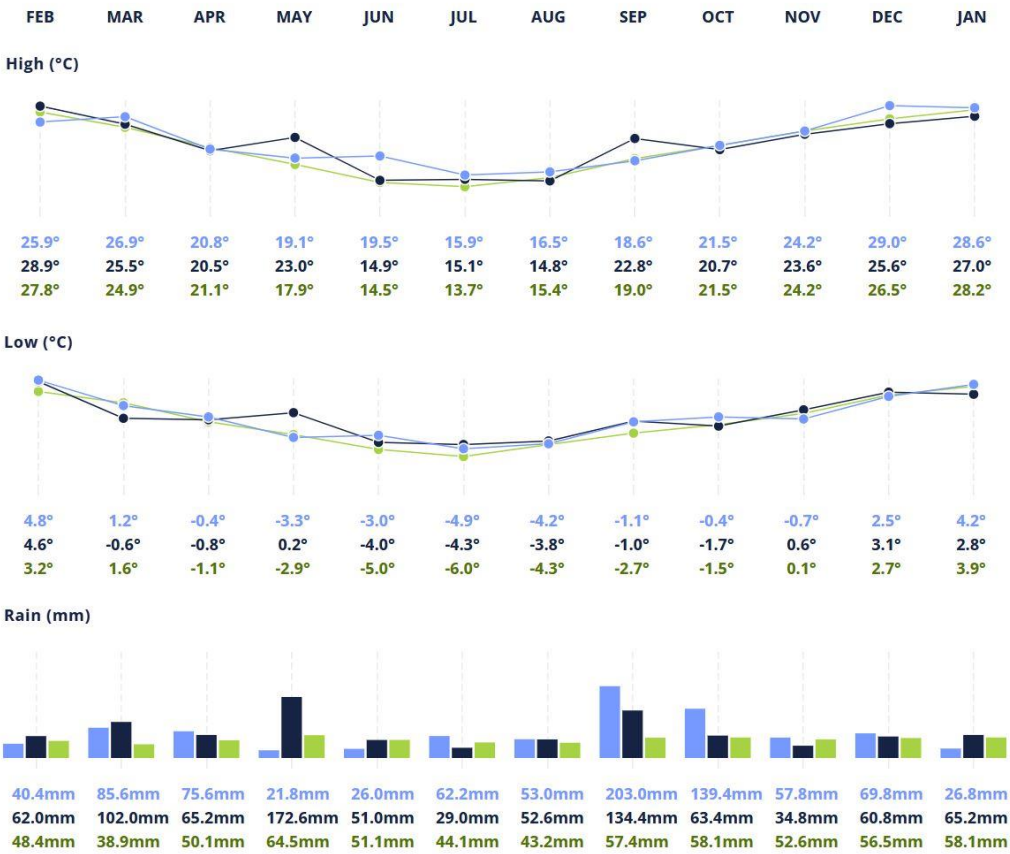
Appendix 2

Monthly rainfall data for 2024, 2025 and historical averages

Past Weather for Queenstown

Yesterday | Last 30 Days | Historical Data

● Feb 2024 - Jan 2025 ● Feb 2023 - Jan 2024 ● Historical average



	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
High (°C)	25.9°	26.9°	20.8°	19.1°	19.5°	15.9°	16.5°	18.6°	21.5°	24.2°	29.0°	28.6°
	28.9°	25.5°	20.5°	23.0°	14.9°	15.1°	14.8°	22.8°	20.7°	23.6°	25.6°	27.0°
	27.8°	24.9°	21.1°	17.9°	14.5°	13.7°	15.4°	19.0°	21.5°	24.2°	26.5°	28.2°
Low (°C)	4.8°	1.2°	-0.4°	-3.3°	-3.0°	-4.9°	-4.2°	-1.1°	-0.4°	-0.7°	2.5°	4.2°
	4.6°	-0.6°	-0.8°	0.2°	-4.0°	-4.3°	-3.8°	-1.0°	-1.7°	0.6°	3.1°	2.8°
	3.2°	1.6°	-1.1°	-2.9°	-5.0°	-6.0°	-4.3°	-2.7°	-1.5°	0.1°	2.7°	3.9°
Rain (mm)	40.4mm	85.6mm	75.6mm	21.8mm	26.0mm	62.2mm	53.0mm	203.0mm	139.4mm	57.8mm	69.8mm	26.8mm
	62.0mm	102.0mm	65.2mm	172.6mm	51.0mm	29.0mm	52.6mm	134.4mm	63.4mm	34.8mm	60.8mm	65.2mm
	48.4mm	38.9mm	50.1mm	64.5mm	51.1mm	44.1mm	43.2mm	57.4mm	58.1mm	52.6mm	56.5mm	58.1mm

The shade of the bar indicates the year or historical average.

Temperature The historical data is the extreme maximum air temperature for the month averaged over a historical period (e.g. 10 years) and the extreme minimum air temperature for the month averaged over a historical period. The data for the previous two years is the highest maximum and lowest minimum recorded for the month.

Rainfall The total rainfall that fell during the month

Observations recorded at Queenstown Airport (AWS-93831)

Appendix 3

Site photographs

Plate A3-1 – Vegetation Plot 1 within Wet Area 1 at Homestead Bay. 30 January 2025.

Plate A3-2 – Vegetation Plot 2 within Wet Area 1 at Homestead Bay. 30 January 2025.

Plate A3-3 – Vegetation Plot 3 within Wet Area 1 at Homestead Bay. 30 January 2025.

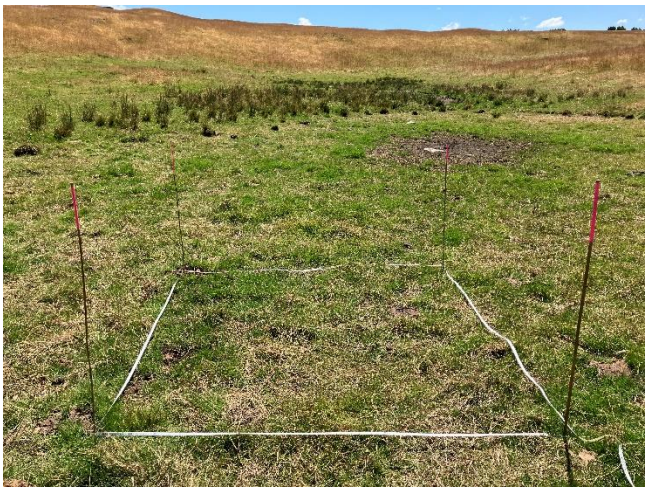


Plate A3-4 – Vegetation Plot 4 within Wet Area 2 at Homestead Bay. 30 January 2025.

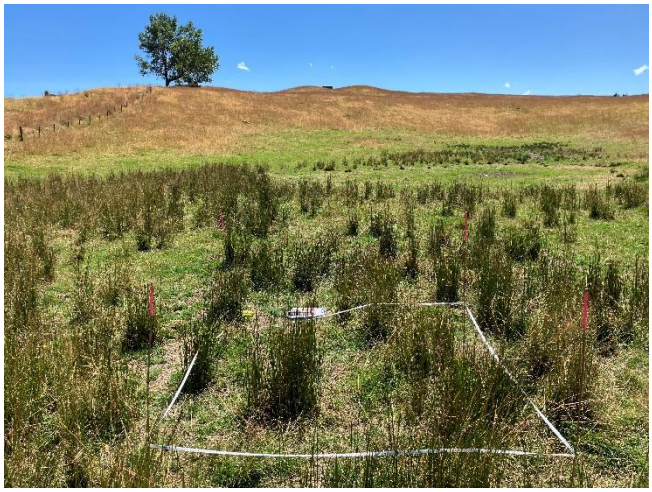


Plate A3-5 – Vegetation Plot 5 within Wet Area 2 at Homestead Bay. 30 January 2025.

Plate A3-6 –Vegetation Plot 6 within Wet Area 2 at Homestead Bay. 30 January 2025.

Plate A3-7 – Vegetation Plot 7 within Wet Area 3 at Homestead Bay. 3 February 2025.

Plate A3-8 – Vegetation Plot 8 within Wet Area 3 at Homestead Bay. 3 February 2025.

Plate A3-9 – Vegetation Plot 9 within Wet Area 3 at Homestead Bay. 3 February 2025.

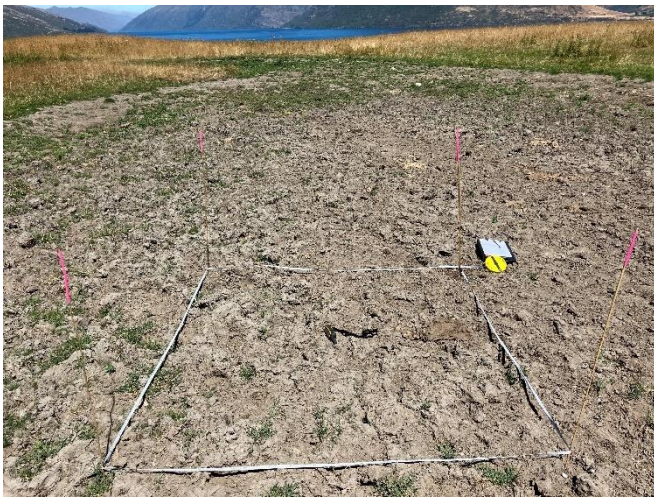


Plate A3-10 – Vegetation Plot 10 within Wet Area 4 at Homestead Bay. 3 February 2025.

Plate A3-11 – Vegetation Plot 11 within Wet Area 4 at Homestead Bay. 3 February 2025.

Plate A3-12 –Vegetation Plot 12 within Wet Area 4 at Homestead Bay. 3 February 2025.

Plate A3-13 – Vegetation Plot 13 within Wet Area 5 at Homestead Bay. 4 February 2025.

Plate A3-14 – Vegetation Plot 14 within Wet Area 6 at Homestead Bay. 4 February 2025.

Plate A3-15 – Vegetation Plot 15 within Wet Area 6 at Homestead Bay. 4 February 2025.

Plate A3-16 – Pond in Wet Area 1 at Homestead Bay. 30 January 2025.

Plate A3-17 – Drain on the upper edge of the large excavation area within Wet Area 7 at Homestead Bay. 30 January 2025.

Plate A3-18 – The large excavation area within Wet Area 7 at Homestead Bay. 30 January 2025.

Appendix 4

Wetland delineation plot sheets

NEW ZEALAND WETLAND DELINEATION DATA FORM

SECTION A – SITE INFORMATION

Site: Homestead Bay | Region: Otago | Sampling point: WA1 - plot 1
Owner: RCL groups | Date: 30/01/2025 | Land use: cultivated & grazed
Landform: Undulating land | Local relief: very slight slope | Land cover: exotic grassland
Is the land drained (circle) YES (NO)* | Investigator(s): Erin Gallagher | Soil °C: Not recorded. | Slope°: mild gradient
GPS (NZTM): E1263952 N4998894 | Altitude m: 388m | Photo Nos: saved to folder
*small pond nearby (possibly man-made), this may be draining the area.

Are climatic/hydrologic conditions on the site typical for this time of year? (YES) NO (circle appropriate; if NO explain in Remarks)
Are vegetation, soil or hydrology significantly disturbed? (circle) Are 'normal circumstances' present? (circle) YES NO
Are vegetation, soil or hydrology naturally problematic? (circle) Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Hydrophytic vegetation present?	YES ☑	NO ☐	Is the sampled area within a wetland?	YES ☑
Hydric soils present?	YES ☑	NO ☐		NO ☐
Wetland hydrology present?	YES ☑	NO ☐		

SECTION B – VEGETATION

Use scientific names of plants. Tree Stratum (Plot size:_____)	Absolute % cover	Dominant Species?	Indicator Status	Pasture species?	% Cover
1.					
2.					
3.					
4.					
Total cover =					
Sapling/Shrub Stratum (Plot size:_____)					
1.					
2.					
3.					
4.					
5.					
Total cover =					
Herb Stratum (Plot size: 2m×2m)					
1. Holcus lanatus	25	Y	FAC	Y	25
2. Agrostis capillaris	40	Y	FACU	Y	40
3. ELEacu	30	Y	OBL		
4. JUNeff	10		FACW		
5. JUNart	3		FACW		
6. TRIrep	0.5		FACU	Y	0.5
7. Carex sp. → CARsin	2		OBL		
8.					
9.					
10.					
11.					
12.					
20% = 22.1 50% = 55.25 Total cover =	110.5		Total pasture species cover (P) = 65.5		

Dominance Test:
No. Dominant Spp. OBL/FACW/FAC (A) 2
Tot. Dominant Spp. across strata (B) 3
% OBL/FACW/FAC (A/B) 67%

Prevalence Index:

Total % cover of:	Multiply by:
OBL 32	x 1 = 32
FACW 13	x 2 = 26
FAC 25	x 3 = 75
FACU 40.5	x 4 = 162
UPL 0	x 5 = 0
Total 110.5 (A)	295 (B)

Prevalence Index (B/A) = 2.67

Hydrophytic vegetation indicators:
☑ Dominance Test is >50%
☑ Prevalence Index is ≤3.0[1]
☐ Morphological adaptations[1] (supporting data in Remarks)
☐ Problematic hydrophytic vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?
YES ☑
NO ☐
UNCERTAIN ☐

Remarks: P/TVC = 59% exotic pasture species present.

Carex sp. is highly likely to be Carex sinclairii. There was no inflorescence which makes identification difficult. Leaf characteristics and habitat match that of CARsin.

SECTION C – SOIL AND HYDROLOGY

Profile description: (Describe to the depth needed to confirm indicator presence/absence, 30 cm default)

Depth (cm)	Matrix colour (moist)	Mottles colour (moist)	Mottles %[1]	Mottles Size[2]	Mottle location[3]	Material[4]	Remarks
0-28	4/1	4/3	5	Very fine	matrix	mineral	
28-38	4/3	4/1	20	Medium	matrix	mineral	

[1]Use % area charts; [2]Use size classes; [3]Ped face, pore, within ped along roots, within matrix; [4]Organic (peaty), humic, mineral soil

Hydric soil indicators:

Soil drainage (circle) W MW (I) P VP

Organic layers:
- ☐ Organic soil material
- ☑ Litter
- ☐ Fibric
- ☐ Mesic
- ☐ Humic
- ☐ Peaty topsoil
- ☐ Peaty subsoil

Concretions:
- ☐ Iron concretions
- ☐ Manganese concretions
- ☐ Nodular

Consistence:
- ☑ Plastic
- ☐ Sticky
- ☐ Fluid

Colours: profile form either:
- ☑ Gley OR
- ☐ Mottled

Horizon:
- ☐ Reductimorphic
- ☐ Redox mottled
- ☐ Redox segregations
- ☐ Perch-gley features

Cause of wetness (circle appropriate):

Location: Depression Flat Valley Gully (Slope)

Water table: Depth (cm) ____

High GW (Perched) Seepage Tidal Lithic

Pans: Depth (cm) _____

Pan Humus Fe-pan Densi- Duri- Fragi Ortstein

Layers: Depth (cm) _____

Slow perm argillic

☐ Pugged

Hydric soils present? YES ☑ NO ☐ UNCERTAIN ☐ NZSC subgroup _____

Primary hydrology indicators: minimum of 1 required; check all boxes that apply

- ☐ Surface water (1A)
- ☐ Groundwater <30 cm (1B)
- ☐ Soil saturation <30 cm (1C)
- ☐ Water marks (2A)
- ☐ Sediment deposits (2B)
- ☐ Drift deposits (2C)
- ☐ Algal mat/crust (2D)
- ☐ Iron deposits (2E)
- ☐ Surface soil cracks (2F)
- ☐ Inundation on aerial imagery (2G)
- ☐ Sparsely vegetated concave surface (2H)
- ☐ Salt crust (2I)
- ☐ Aquatic invertebrates (2J)
- ☐ Hydrogen sulphide odour (3A)
- ☐ Oxidised rhizosphere on roots (3B)
- ☐ Reduced iron (3C)
- ☑ Reduced iron in tilled soil (3D)
- ☐ High water table stunted/stressed plants (4A)

Secondary hydrology indicators: minimum of 2 required; check all boxes that apply

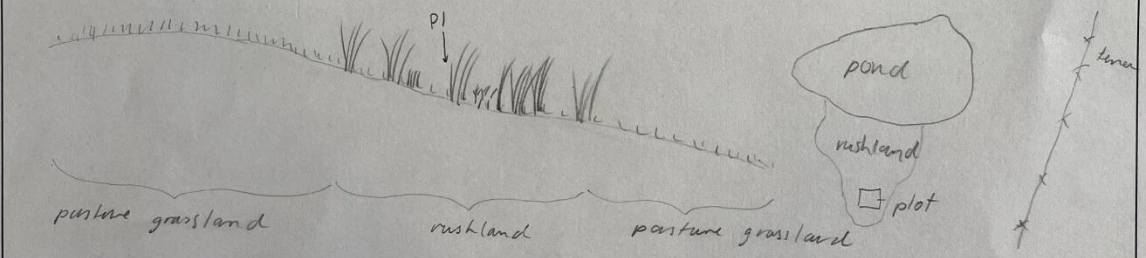
- ☐ Water-stained leaves (2K)
- ☐ Drainage patterns (2L)
- ☐ Dry-season water table (3E)
- ☐ Saturation in aerial imagery (3F)
- ☐ Geomorphic position (4B)
- ☐ Shallow aquitard (4C)
- ☐ FAC-neutral test (4D)
- ☐ Frost-heave hummocks (4E)

FAC-neutral test (4D); refer to Section B: Vegetation

1. No. OBL & FACW dominant species	1 (A)
2. No. FACU & UPL dominant species	1 (B)
3. Total	2 (A+B)
4. FAC-neutral (>50%)	50 (A/A+B)*100

Wetland hydrology present? YES ☑ NO ☐

Sketch of site/soil:



Remarks:

Soft rush - Yorkshire fog - browntop; (sharp spike sedge) rushland marsh

Other species present = Carex sp., PHLpra

* blue dragonfly, paradise ducks (1 x dead in pond), RUMobt
* wetland above potentially artificial pond.

NEW ZEALAND WETLAND DELINEATION DATA FORM

SECTION A – SITE INFORMATION

Site: Homestead Bay | Region: Otago | Sampling point: WA1 - plot 2

Owner: RCL group | Date: 30/1/2025 | Land use: cultivated & grazed

Landform: undulating land | Local relief: concave to flat | Land cover: exotic grassland

Is the land drained (circle) YES (NO) | Investigator(s): Erin Gallagher | Soil °C: not recorded | Slope°: concave

GPS (NZTM): E1265993 N4998871 | Altitude m: 389 | Photo Nos: saved in report folder

Are climatic/hydrologic conditions on the site typical for this time of year? (YES) NO (circle appropriate; if NO explain in Remarks)

Are vegetation, (soil) or hydrology significantly disturbed? (circle) | Are 'normal circumstances' present? (circle) (YES) NO

Are vegetation, soil or (hydrology) naturally problematic? (circle) | Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Hydrophytic vegetation present? YES ☐ ☑ NO **Is the sampled area within a wetland? YES** ☐

Hydric soils present? ~~YES ☐ ☐ NO~~ **NO** ☑

Wetland hydrology present? ~~YES ☐ ☐ NO~~

SECTION B – VEGETATION

Use scientific names of plants. Tree Stratum (Plot size:_____)	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total cover =			
Sapling/Shrub Stratum (Plot size:_____)			
1.			
2.			
3.			
4.			
5.			
Total cover =			
Herb Stratum (Plot size: 2m²)			
1. Holcus lanatus	3	Y	FAC
2. Cirsium vulgaris	4	Y	FACU
3. Lolium perrenne	0.1		FACU
4. Capsella bursa-pastoris	2		None → UPL
5. Anthoxanthum odoratum	2		FACU
6. Cerastium glomeratum	0.1		FACU
7. Sonchus asper	0.1		FACU
8.			
9.			
10.			
11.			
12.			
20% = 2.26 50% = 5.65 Total cover =			

Dominance Test:

No. Dominant Spp. OBL/FACW/FAC (A) 1

Tot. Dominant Spp. across strata (B) 2

% OBL/FACW/FAC (A/B) 50

Prevalence Index:

Total % cover of:	Multiply by:
OBL 0	x 1 = 0
FACW 0	x 2 = 0
FAC 3	x 3 = 9
FACU 6.3	x 4 = 25.2
UPL 2	x 5 = 10
Total 11.3 (A)	44.2 (B)

Prevalence Index (B/A) = 3.91

Hydrophytic vegetation indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological adaptations[1] (supporting data in Remarks)
- ☐ Problematic hydrophytic vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?

YES ☐

NO ☑

UNCERTAIN ☐

Remarks:

- pugging and slight surface cracks
- no further tests undertaken.

NEW ZEALAND WETLAND DELINEATION DATA FORM

SECTION A – SITE INFORMATION

Site: Homestead Bay | Region: Otago | Sampling point: WA1 - plot 3

Owner: RCL group | Date: 30/01/2025 | Land use: cultivated & grazed

Landform: undulating land | Local relief: very small gully | Land cover: exotic grassland

Is the land drained (circle) YES (NO) | Investigator(s): Erin Gallagher | Soil °C: not recorded | Slope°: gradual slope

GPS (NZTM): E 1265918 N 4998864 | Altitude m: 386 | Photo Nos: saved to report folder

Are climatic/hydrologic conditions on the site typical for this time of year? (YES) NO (circle appropriate; if NO explain in Remarks)

Are vegetation, soil or hydrology significantly disturbed? (circle) | Are 'normal circumstances' present? (circle) YES NO

Are vegetation, soil or hydrology naturally problematic? (circle) | Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Hydrophytic vegetation present? YES ☑ NO ☐ **Is the sampled area within a wetland? YES ☑ NO ☐**

Hydric soils present? YES ☐ NO ☐

Wetland hydrology present? YES ☐ NO ☐

SECTION B – VEGETATION

Use scientific names of plants.	Absolute % cover	Dominant Species?	Indicator Status	Pasture species? (% cover)
Tree Stratum (Plot size:_____)				
1.				
2.				
3.				
4.				
Total cover =				
Sapling/Shrub Stratum (Plot size:_____)				
1.				
2.				
3.				
4.				
5.				
Total cover =				
Herb Stratum (Plot size: 2m²)				
1. Holcus lanatus	30	y	FAC	y 30
2. Juncus effusus	35	y	FACW	
3. Glyceria declinata	15		OBL	
4. Azolla rubra	0.1		OBL	
5. Juncus articulatus	1		FACW	
6. Cirsium arvense	0.5		FACU	
7. Rumex crispus	0.5		FAC	
8.				
9.				
10.				
11.				
12.				
20% = 16.42 80% = 41.02 Total cover =	82.1		Total pasture species cover (P)	=30

Dominance Test:

No. Dominant Spp. OBL/FACW/FAC (A) 2

Tot. Dominant Spp. across strata (B) 2

% OBL/FACW/FAC (A/B) 100

Prevalence Index:

Total % cover of:		Multiply by:	
OBL	15.1	x 1 =	15
FACW	36	x 2 =	72
FAC	30.5	x 3 =	91.5
FACU	0.5	x 4 =	2
UPL	0	x 5 =	0
Total	82.1 (A)		180.5 (B)

Prevalence Index (B/A) = 2.20

Hydrophytic vegetation indicators:

☑ Dominance Test is >50%

☑ Prevalence Index is ≤3.0[1]

☐ Morphological adaptations[1] (supporting data in Remarks)

☐ Problematic hydrophytic vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?

YES ☑

NO ☐

UNCERTAIN ☐

Remarks:

No further assessments required.

Possible man-made pond above this wetland channel.

(P/TVC) ×100 = 37% pasture species

SECTION C – SOIL AND HYDROLOGY

Profile description: (Describe to the depth needed to confirm indicator presence/absence, 30 cm default)

Depth (cm)	Matrix colour (moist)	Mottles colour (moist)	Mottles %[1]	Mottles Size[2]	Mottle location[3]	Material[4]	Remarks

[1]Use % area charts; [2]Use size classes; [3]Ped face, pore, within ped along roots, within matrix; [4]Organic (peaty), humic, mineral soil

Hydric soil indicators:

Soil drainage (circle) W MW I P VP

Organic layers:
- ☐ Organic soil material
- ☐ Litter
- ☐ Fibric
- ☐ Mesic
- ☐ Humic
- ☐ Peaty topsoil
- ☐ Peaty subsoil

Concretions:
- ☐ Iron concretions
- ☐ Manganese concretions
- ☐ Nodular

Consistence:
- ☐ Plastic
- ☐ Sticky
- ☐ Fluid

Colours: profile form either:
- ☐ Gley OR
- ☐ Mottled

Horizon:
- ☐ Reductimorphic
- ☐ Redox mottled
- ☐ Redox segregations
- ☐ Perch-gley features

Cause of wetness (circle appropriate):

Location: Depression Flat Valley Gully Slope

Water table: Depth (cm) ____

High GW Perched Seepage Tidal Lithic

Pans: Depth (cm) _____

Pan Humus Fe-pan Densi- Duri- Fragi Ortstein

Layers: Depth (cm) _____

Slow perm argillic

☑ Pugged

Hydric soils present? YES ☐ NO ☐ UNCERTAIN ☐ NZSC subgroup _____

Primary hydrology indicators: minimum of 1 required; check all boxes that apply

- ☑ Surface water (1A)
- ☐ Groundwater <30 cm (1B)
- ☐ Soil saturation <30 cm (1C)
- ☑ Water marks (2A)
- ☐ Sediment deposits (2B)
- ☐ Drift deposits (2C)
- ☐ Algal mat/crust (2D)
- ☐ Iron deposits (2E)
- ☐ Surface soil cracks (2F)
- ☐ Inundation on aerial imagery (2G)
- ☐ Sparsely vegetated concave surface (2H)
- ☐ Salt crust (2I)
- ☐ Aquatic invertebrates (2J)
- ☐ Hydrogen sulphide odour (3A)
- ☐ Oxidised rhizosphere on roots (3B)
- ☐ Reduced iron (3C)
- ☐ Reduced iron in tilled soil (3D)
- ☐ High water table stunted/stressed plants (4A)

Secondary hydrology indicators: minimum of 2 required; check all boxes that apply

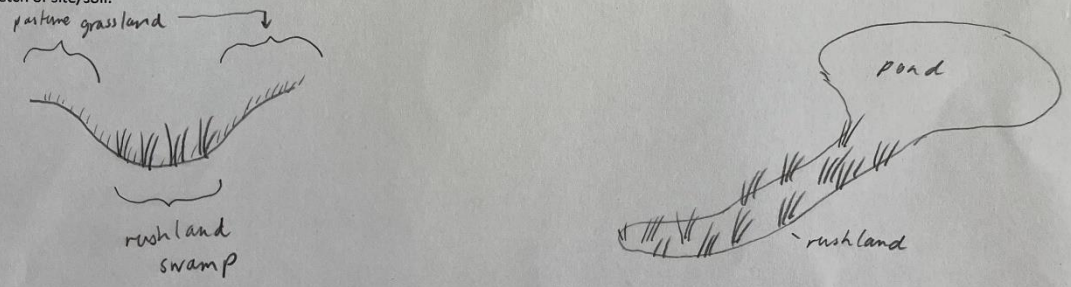
- ☐ Water-stained leaves (2K)
- ☐ Drainage patterns (2L)
- ☐ Dry-season water table (3E)
- ☐ Saturation in aerial imagery (3F)
- ☐ Geomorphic position (4B)
- ☐ Shallow aquitard (4C)
- ☐ FAC-neutral test (4D)
- ☐ Frost-heave hummocks (4E)

FAC-neutral test (4D); refer to Section B: Vegetation

1. No. OBL & FACW dominant species _____(A)
2. No. FACU & UPL dominant species _____(B)
3. Total _____(A+B)
4. FAC-neutral (>50%) _____(A/A+B)*100

Wetland hydrology present? YES ☑ NO ☐

Sketch of site/soil:



Remarks:

Soft rush - Yorkshire fog - floating sweetgrass rushland swamp

Other species = AZOrub, RUMcri, CIRarv, TRIpra

→ surface water, pugging

NEW ZEALAND WETLAND DELINEATION DATA FORM

SECTION A – SITE INFORMATION

Site: Homestead Bay | Region: Otago | Sampling point: WA2 - plot 4
Owner: RCL Group | Date: 30/01/2025 | Land use: cultivated & grazed
Landform: wide gully | Local relief: concave | Land cover: exotic grassland
Is the land drained (circle) YES NO | Investigator(s): Erin Gallagher | Soil °C: not recorded | Slope°: n/a
GPS (NZTM): E1265293 N4997762 | Altitude m: 364 | Photo Nos: saved in report folder

Are climatic/hydrologic conditions on the site typical for this time of year? (YES) NO (circle appropriate; if NO explain in Remarks)
Are vegetation, soil or hydrology significantly disturbed? (circle) Are 'normal circumstances' present? (circle) (YES) NO
Are vegetation, soil or hydrology naturally problematic? (circle) Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Hydrophytic vegetation present? YES ☑ NO ☐ **Is the sampled area within a wetland? YES ☑ NO ☐**
Hydric soils present? YES ☐ NO ☐
Wetland hydrology present? YES ☐ NO ☐

SECTION B – VEGETATION

Use scientific names of plants. Tree Stratum (Plot size:_____)	Absolute % cover	Dominant Species?	Indicator Status	Pasture Species? Cover %
1.				
2.				
3.				
4.				
Total cover =				
Sapling/Shrub Stratum (Plot size:_____)				
1.				
2.				
3.				
4.				
5.				
Total cover =				
Herb Stratum (Plot size:_____)				
1. Alopecurus geniculatus	95	Y	FACW	
2. Lobelia perpusilla	40	Y	FACW	
3. Juncus articulatus	0.5		FACW	
4. Galium sp. → GALpal	0.1		OBL	
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
20% = 27.12 80% = 67.8 Total cover =	135.6			Total pasture species cover (%) = 0

Dominance Test:
No. Dominant Spp. OBL/FACW/FAC (A) 2
Tot. Dominant Spp. across strata (B) 2
% OBL/FACW/FAC (A/B) 100

Prevalence Index:

Total % cover of:		Multiply by:	
OBL	0.1	x 1 =	0.1
FACW	135.5	x 2 =	271
FAC	0	x 3 =	0
FACU	0	x 4 =	0
UPL	0	x 5 =	0
Total	135.6 (A)		271.1 (B)

Prevalence Index (B/A) = 2.0

Hydrophytic vegetation indicators:
☑ Dominance Test is >50%
☑ Prevalence Index is ≤3.0[1]
☐ Morphological adaptations[1] (supporting data in Remarks)
☐ Problematic hydrophytic vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?
YES ☑
NO ☐
UNCERTAIN ☐

Remarks:
* Kneed foxtail - Lobelia perpusilla grassland marsh
Other species = JUNart, GLYdec
→ small area unvegetated. JUNeff on margins.
→ no pasture species present.
* no further assessments required / undertaken.
→ Galium sp. highly likely GALpal.

NEW ZEALAND WETLAND DELINEATION DATA FORM

SECTION A – SITE INFORMATION

Site: Homestead Bay | Region: Otago | Sampling point: WA2 - plot 5
Owner: RCL groups | Date: 30/01/2025 | Land use: cultivated & grazed
Landform: undulating land | Local relief: flat | Land cover: exotic grassland
Is the land drained (circle) YES (NO) | Investigator(s): Erin Gallagher | Soil °C: not measured | Slope°: n/a
GPS (NZTM): E1265302 N4997743 | Altitude m: 360 | Photo Nos: save in report folder R7483

Are climatic/hydrologic conditions on the site typical for this time of year? (YES) NO (circle appropriate; if NO explain in Remarks)
Are vegetation, soil or hydrology significantly disturbed? (circle) | Are 'normal circumstances' present? (circle) YES (NO)
Are vegetation, soil or hydrology naturally problematic? (circle) | Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Hydrophytic vegetation present?	YES ☐	☑ NO	**Is the sampled area within a wetland?**	**YES** ☐
Hydric soils present?	YES ☑	☐ NO		**NO** ☑
Wetland hydrology present?	YES ☐	☑ NO		

SECTION B – VEGETATION

Use scientific names of plants.	Absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:_____)			
1.			
2.			
3.			
4.			
Total cover =			
Sapling/Shrub Stratum (Plot size:_____)			
1.			
2.			
3.			
4.			
5.			
Total cover =			
Herb Stratum (Plot size: 2m²)			
1. Juncus australis	30	y	FACW
2. Lobelia perpusilla	5		FACW
3. Agrostis capillaris	20	y	FACU
4. Trifolium repens	0.5		FACU
5. Leontodon saxatilis	0.1		FAC
6. Lolium perenne	25	y	FACU
7.			
8.			
9.			
10.			
11.			
12.			
20% = 16.12 / 50% = 40.3 Total cover =	80.6		

Dominance Test:
No. Dominant Spp. OBL/FACW/FAC (A) 1
Tot. Dominant Spp. across strata (B) 3
% OBL/FACW/FAC (A/B) 33%

Prevalence Index:

Total % cover of:		Multiply by:	
OBL	0	x 1 =	0
FACW	35	x 2 =	70
FAC	0.1	x 3 =	0.3
FACU	45.5	x 4 =	182
UPL	0	x 5 =	0
Total	80.6 (A)		252.3 (B)

Prevalence Index (B/A) = 3.13

Hydrophytic vegetation indicators:
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological adaptations[1] (supporting data in Remarks)
☐ Problematic hydrophytic vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?
YES ☐
NO ☐
UNCERTAIN ☑

Remarks:
Uncertain results, more assessments undertaken.

SECTION C – SOIL AND HYDROLOGY

Profile description: (Describe to the depth needed to confirm indicator presence/absence, 30 cm default)

Depth (cm)	Matrix colour (moist)	Mottles colour (moist)	Mottles %[1]	Mottles Size[2]	Mottle location[3]	Material[4]	Remarks
0-17	6/3	5/8	3%	Medium	Matrix	mineral	
17-25	3/1	6/2	7%	Medium	Matrix	mineral	
25-32	6/2	5/2	7%	Medium	Matrix	mineral	
25-32	6/2	5/8	1%	Fine	Matrix	mineral	

[1]Use % area charts; [2]Use size classes; [3]Ped face, pore, within ped along roots, within matrix; [4]Organic (peaty), humic, mineral soil

Hydric soil indicators:

Soil drainage (circle) W MW I (P) VP

Organic layers:
- ☐ Organic soil material
- ☑ Litter
- ☐ Fibric
- ☐ Mesic
- ☐ Humic
- ☐ Peaty topsoil
- ☐ Peaty subsoil

Concretions:
- ☑ Iron concretions
- ☐ Manganese concretions
- ☐ Nodular

Consistence:
- ☑ Plastic
- ☐ Sticky
- ☐ Fluid

Colours: profile form either:
- ☑ Gley OR
- ☐ Mottled

Horizon:
- ☐ Reductimorphic
- ☐ Redox mottled
- ☐ Redox segregations
- ☐ Perch-gley features

Cause of wetness (circle appropriate):

Location: Depression (Flat) Valley Gully Slope

Water table: Depth (cm) ____

High GW (Perched) Seepage Tidal Lithic

Pans: Depth (cm) _____

Pan Humus Fe-pan Densi- Duri- Fragi Ortstein

Layers: Depth (cm) _____

Slow perm argillic

☐ Pugged

Hydric soils present? YES ☑ NO ☐ UNCERTAIN ☐ NZSC subgroup _____

Primary hydrology indicators: minimum of 1 required; check all boxes that apply

- ☐ Surface water (1A)
- ☐ Groundwater <30 cm (1B)
- ☐ Soil saturation <30 cm (1C)
- ☐ Water marks (2A)
- ☐ Sediment deposits (2B)
- ☐ Drift deposits (2C)
- ☐ Algal mat/crust (2D)
- ☐ Iron deposits (2E)
- ☐ Surface soil cracks (2F)
- ☐ Inundation on aerial imagery (2G)
- ☐ Sparsely vegetated concave surface (2H)
- ☐ Salt crust (2I)
- ☐ Aquatic invertebrates (2J)
- ☐ Hydrogen sulphide odour (3A)
- ☐ Oxidised rhizosphere on roots (3B)
- ☐ Reduced iron (3C)
- ☐ Reduced iron in tilled soil (3D)
- ☐ High water table stunted/stressed plants (4A)

Secondary hydrology indicators: minimum of 2 required; check all boxes that apply

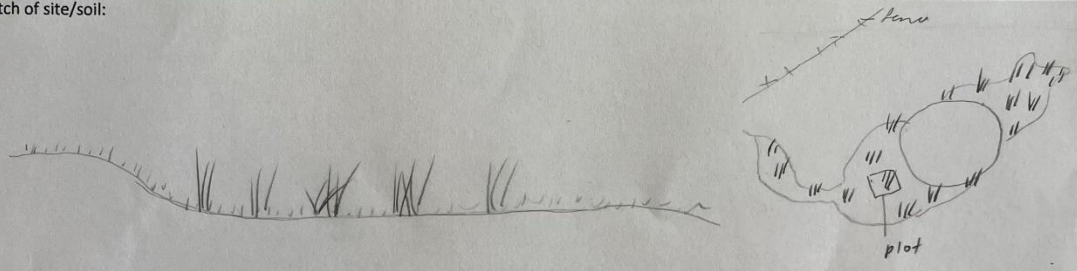
- ☐ Water-stained leaves (2K)
- ☐ Drainage patterns (2L)
- ☐ Dry-season water table (3E)
- ☐ Saturation in aerial imagery (3F)
- ☐ Geomorphic position (4B)
- ☐ Shallow aquitard (4C)
- ☐ FAC-neutral test (4D)
- ☐ Frost-heave hummocks (4E)

FAC-neutral test (4D); refer to Section B: Vegetation

1. No. OBL & FACW dominant species	1	(A)
2. No. FACU & UPL dominant species	2	(B)
3. Total	3	(A+B)
4. FAC-neutral (>50%)	33.3	(A/A+B)*100

Wetland hydrology present? YES ☐ NO ☑

Sketch of site/soil:



Remarks:

Other species = Juncus sp., Carex sp.

NEW ZEALAND WETLAND DELINEATION DATA FORM

SECTION A – SITE INFORMATION

Site: Homestead Bay | Region: Otago | Sampling point: WA2 - plot 6

Owner: RCL Group | Date: 30/01/2025 | Land use: cultivated & grazed

Landform: undulating land | Local relief: gradual slope/gully | Land cover: exotic grassland

Is the land drained (circle) (YES) NO | Investigator(s): Erin Gallagher | Soil °C: not measured | Slope°: gradual

GPS (NZTM): E1265284 N4997812 | Altitude m: 360 | Photo Nos: save in report folder R7483

Are climatic/hydrologic conditions on the site typical for this time of year? (YES) NO (circle appropriate; if NO explain in Remarks)

Are vegetation, soil or hydrology* significantly disturbed? (circle) | Are 'normal circumstances' present? (circle) YES (NO)

Are vegetation, soil or hydrology naturally problematic? (circle) | Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Hydrophytic vegetation present? YES ☐ ☑ NO | **Is the sampled area within a wetland? YES ☐**

Hydric soils present? ~~YES ☐~~ ☐ ~~NO~~ | **NO ☑**

Wetland hydrology present? ~~YES ☐~~ ☐ ~~NO~~

SECTION B – VEGETATION

Use scientific names of plants. Tree Stratum (Plot size:_____)	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total cover =			
Sapling/Shrub Stratum (Plot size:_____)			
1.			
2.			
3.			
4.			
5.			
Total cover =			
Herb Stratum (Plot size: 2m²)			
1. Juncus effusus	35	y	FACW
2. Trifolium repens	60	y	FACU
3. Agrostis capillaris	15		FACU
4. Juncus articulatus	1		FACW
5. Lolium perenne	1		FACU
6. Leontodon saxatilis	0.1		FAC
7. Cynosurus cristatus	0.1		UPL
8.			
9.			
10.			
11.			
12.			
20% = 22.64 50% = 56.6 Total cover =	113.2		

Dominance Test:
No. Dominant Spp. OBL/FACW/FAC (A) 1
Tot. Dominant Spp. across strata (B) 2
% OBL/FACW/FAC (A/B) 50%

Prevalence Index:

Total % cover of:		Multiply by:	
OBL	0	x 1 =	0
FACW	36	x 2 =	72
FAC	0.1	x 3 =	0.3
FACU	76	x 4 =	304
UPL	0.1	x 5 =	0.5
Total	112.2 (A)		376.8 (B)

Prevalence Index (B/A) = 3.36

Hydrophytic vegetation indicators:
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological adaptations[1] (supporting data in Remarks)
- ☐ Problematic hydrophytic vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?
YES ☐
NO ☑
UNCERTAIN ☐

Remarks:
*Drain dug within edge of wetland.
- No further tests undertaken/required.

NEW ZEALAND WETLAND DELINEATION DATA FORM

SECTION A – SITE INFORMATION

Site: Homestead Bay | Region: Otago | Sampling point: WA2 - plot 7

Owner: RCL Group | Date: 3/2/2025 | Land use: cultivated & grazed

Landform: gently rolling hill country | Local relief: flat | Land cover: exotic grassland

Is the land drained (circle) YES (NO) | Investigator(s): Erin Gallagher | Soil °C: not recorded | Slope°: n/a

GPS (NZTM): E1265288 N4997752 | Altitude m: 363 | Photo Nos: saved in report folder R7483

Are climatic/hydrologic conditions on the site typical for this time of year? YES NO (circle appropriate; if NO explain in Remarks)

Are vegetation, soil or hydrology significantly disturbed? (circle) | Are 'normal circumstances' present? (circle) (YES) NO

Are vegetation, soil or hydrology naturally problematic? (circle) | Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Hydrophytic vegetation present? YES ☐ ☑ NO | **Is the sampled area within a wetland? YES** ☐

Hydric soils present? ~~YES~~ ☐ ☐ NO uncertain | **NO** ☑

Wetland hydrology present? YES ☐ ☑ NO

SECTION B – VEGETATION

Use scientific names of plants. Tree Stratum (Plot size:_____)	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total cover =			
Sapling/Shrub Stratum (Plot size:_____)			
1.			
2.			
3.			
4.			
5.			
Total cover =			
Herb Stratum (Plot size: 2m²)			
1. Juncus australis	55	y	FACW
2. Trifolium repens	25	y	FACU
3. Agrostis capillaris	35	y	FACU
4. Leontodon saxatilis	1		FAC
5. Cynosurus cristatus	1		UPL
6. Juncus tenuis	1		FACW
7. Lolium perenne	1		FACU
8.			
9.			
10.			
11.			
12.			
20% = 23.8 50% = 59.5 Total cover =	119		

Dominance Test:

No. Dominant Spp. OBL/FACW/FAC (A) 1

Tot. Dominant Spp. across strata (B) 3

% OBL/FACW/FAC (A/B) 33

Prevalence Index:

Total % cover of:	Multiply by:
OBL 0	x 1 = 0
FACW 55	x 2 = 110
FAC 1	x 3 = 3
FACU 61	x 4 = 244
UPL 1	x 5 = 5
Total 118 (A)	362 (B)

Prevalence Index (B/A) = 3.07

Hydrophytic vegetation indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological adaptations[1] (supporting data in Remarks)
- ☐ Problematic hydrophytic vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?

YES ☐

NO ☐

UNCERTAIN ☑

Remarks:

SECTION C – SOIL AND HYDROLOGY

Profile description: (Describe to the depth needed to confirm indicator presence/absence, 30 cm default)

Actual Depth (cm)	Depth (cm) Photo	Matrix colour (moist)	Mottles colour (moist)	Mottles %[1]	Mottles Size[2]	Mottle location[3]	Material[4]	Remarks
20 - 32	0 - 12	5/2	5/8	1	Medium	Matrix	mineral	
14 - 20	12 - 18	4/2	6/3	15	Fine	Matrix	mineral	
4 - 14	18 - 28	6/3	5/2	15	Fine	Matrix	mineral	
0 - 4	28 - 32	4/2	–	–	–	–		Litter / roots

[1]Use % area charts; [2]Use size classes; [3]Ped face, pore, within ped along roots, within matrix; [4]Organic (peaty), humic, mineral soil

Hydric soil indicators:

Soil drainage (circle) W MW I (P) VP

Organic layers:
- ☐ Organic soil material
- ☐ Litter
- ☐ Fibric
- ☐ Mesic
- ☐ Humic
- ☐ Peaty topsoil
- ☐ Peaty subsoil

Concretions:
- ☐ Iron concretions
- ☐ Manganese concretions
- ☐ Nodular

Consistence:
- ☐ Plastic
- ☐ Sticky
- ☐ Fluid

Colours: profile form either:
- ☑ Gley OR
- ☐ Mottled

Horizon:
- ☐ Reductimorphic
- ☐ Redox mottled
- ☐ Redox segregations
- ☐ Perch-gley features

Cause of wetness (circle appropriate):

Location: Depression (Flat) Valley Gully Slope

Water table: Depth (cm) ____

High GW (Perched) Seepage Tidal Lithic

Pans: Depth (cm) _____

Pan Humus Fe-pan Densi- Duri- Fragi Ortstein

Layers: Depth (cm) _____

Slow perm argillic

☐ Pugged

Hydric soils present? YES ☐ NO ☐ UNCERTAIN ☑ NZSC subgroup _____

Primary hydrology indicators: minimum of 1 required; check all boxes that apply

- ☐ Surface water (1A)
- ☐ Groundwater <30 cm (1B)
- ☐ Soil saturation <30 cm (1C)
- ☐ Water marks (2A)
- ☐ Sediment deposits (2B)
- ☐ Drift deposits (2C)
- ☐ Algal mat/crust (2D)
- ☐ Iron deposits (2E)
- ☐ Surface soil cracks (2F)
- ☐ Inundation on aerial imagery (2G)
- ☐ Sparsely vegetated concave surface (2H)
- ☐ Salt crust (2I)
- ☐ Aquatic invertebrates (2J)
- ☐ Hydrogen sulphide odour (3A)
- ☐ Oxidised rhizosphere on roots (3B)
- ☐ Reduced iron (3C)
- ☐ Reduced iron in tilled soil (3D)
- ☐ High water table stunted/stressed plants (4A)

Secondary hydrology indicators: minimum of 2 required; check all boxes that apply

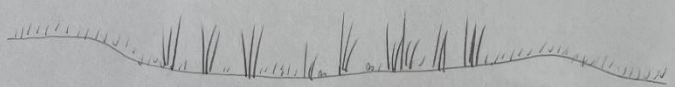
- ☐ Water-stained leaves (2K)
- ☐ Drainage patterns (2L)
- ☐ Dry-season water table (3E)
- ☐ Saturation in aerial imagery (3F)
- ☐ Geomorphic position (4B)
- ☐ Shallow aquitard (4C)
- ☐ FAC-neutral test (4D)
- ☐ Frost-heave hummocks (4E)

FAC-neutral test (4D); refer to Section B: Vegetation

1. No. OBL & FACW dominant species	1 (A)
2. No. FACU & UPL dominant species	2 (B)
3. Total	3 (A+B)
4. FAC-neutral (>50%)	33.3 (A/A+B)*100

Wetland hydrology present? YES ☐ NO ☑

Sketch of site/soil:



Remarks:

NEW ZEALAND WETLAND DELINEATION DATA FORM

SECTION A – SITE INFORMATION

Site: Homestead Bay | Region: Otago | Sampling point: WA3 - plot 8

Owner: RCL Group | Date: 3/2/2025 | Land use: cultivated & grazed

Landform: gentle rolling hill country | Local relief: flat | Land cover: exotic grassland

Is the land drained (circle) YES (NO) | Investigator(s): Erin Gallagher | Soil °C: Not recorded Slope°: flat

GPS (NZTM): E1265398 N4997849 | Altitude m: 369 | Photo Nos: saved in report folder R 7483a

Are climatic/hydrologic conditions on the site typical for this time of year? YES NO (circle appropriate; if NO explain in Remarks)

Are vegetation, soil or hydrology significantly disturbed? (circle) | Are 'normal circumstances' present? (circle) (YES) NO

Are vegetation, soil or hydrology naturally problematic? (circle) | Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Hydrophytic vegetation present? YES ☐ ☑ NO | **Is the sampled area within a wetland? YES** ☐

Hydric soils present? ~~YES~~ ☐ ☐ ~~NO~~ | **NO** ☑

Wetland hydrology present? ~~YES~~ ☐ ☐ ~~NO~~

SECTION B – VEGETATION

Use scientific names of plants.	Absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:_____)			
1.			
2.			
3.			
4.			
Total cover =			
Sapling/Shrub Stratum (Plot size:_____)			
1.			
2.			
3.			
4.			
5.			
Total cover =			
Herb Stratum (Plot size: 2m²)			
1. Lolium perenne	70	Y	FACU
2. Trifolium repens	1		FACU
3. Plantago australis	1		FAC
4. Leontodon saxatilis	1		FAC
5. Anthoxanthum odoratum	1		FACU
6. Verbascum virgatum	1		None → UPL
7. Cirsium vulgare	2		FACU
8. Sagina procumbens	0.5		FACU
9.			
10.			
11.			
12.			
20% = 15.5 50% = 38.75 Total cover =	77.5		

Dominance Test:

No. Dominant Spp. OBL/FACW/FAC (A) 0

Tot. Dominant Spp. across strata (B) 1

% OBL/FACW/FAC (A/B) 0 %

Prevalence Index:

Total % cover of:		Multiply by:	
OBL	0	x 1 =	0
FACW	0	x 2 =	0
FAC	2	x 3 =	6
FACU	73.5	x 4 =	294
UPL	1	x 5 =	5
Total	77.5 (A)		309 (B)

Prevalence Index (B/A) = 3.99

Hydrophytic vegetation indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological adaptations[1] (supporting data in Remarks)
- ☐ Problematic hydrophytic vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?

YES ☐

NO ☑

UNCERTAIN ☐

Remarks:

No further tests required / undertaken.

NEW ZEALAND WETLAND DELINEATION DATA FORM

SECTION A – SITE INFORMATION

Site: Homestead Bay | Region: Otago | Sampling point: WA3 - plot 9

Owner: RCL Groups | Date: 3/2/2025 | Land use: cultivated & grazed

Landform: gentle rolling hill country | Local relief: concave | Land cover: exotic grassland

Is the land drained (circle) YES (NO) | Investigator(s): Erin Gallagher | Soil °C: not recorded | Slope°: concave

GPS (NZTM): E1265401 N4997872 | Altitude m: 370 | Photo Nos: saved in report folder R7483a

Are climatic/hydrologic conditions on the site typical for this time of year? (YES) NO (circle appropriate; if NO explain in Remarks)

Are vegetation, soil, or hydrology significantly disturbed? (circle) | Are 'normal circumstances' present? (circle) (YES) NO

Are vegetation, soil or hydrology naturally problematic? (circle) | Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Hydrophytic vegetation present? YES ☐ NO ☐ → uncertain

Hydric soils present? YES ☑ NO ☐

Wetland hydrology present? YES ☑ NO ☐

Is the sampled area within a wetland? YES ☑ NO ☐

SECTION B – VEGETATION

Use scientific names of plants. Tree Stratum (Plot size:_____)	Absolute % cover	Dominant Species?	Indicator Status	Pasture Species?	% cover
1.					
2.					
3.					
4.					
Total cover =					
Sapling/Shrub Stratum (Plot size:_____)					
1.					
2.					
3.					
4.					
5.					
Total cover =					
Herb Stratum (Plot size: 2m²)					
1. Plantago australis	2	y	FAC		
2. Lolium perenne	0.1		FACU	y	0.1
3. Urtica urens *	1	y	None (UPL)		
4. Dysphania pumilio	0.5		None (UPL)		
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
20% = 0.72 50% = 1.8 Total cover =	3.6		Total pasture species cover (P) =		0.1

Dominance Test:

No. Dominant Spp. OBL/FACW/FAC (A) 1

Tot. Dominant Spp. across strata (B) 2

% OBL/FACW/FAC (A/B) 50%

Prevalence Index:

Total % cover of:		Multiply by:	
OBL	0	x 1 =	0
FACW	0	x 2 =	0
FAC	2	x 3 =	6
FACU	0.1	x 4 =	0.4
UPL	1.5	x 5 =	7.5
Total	3.6 (A)		13.9 (B)

Prevalence Index (B/A) = 3.86

Hydrophytic vegetation indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological adaptations[1] (supporting data in Remarks)
- ☐ Problematic hydrophytic vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?

YES ☐

NO ☐

UNCERTAIN ☑

Remarks:

* likely FACU.

(P/TVC) x 100 = 3% pasture species

SECTION C – SOIL AND HYDROLOGY

Profile description: (Describe to the depth needed to confirm indicator presence/absence, 30 cm default)

Actual depth (cm)	Depth (cm)	Matrix colour (moist)	Mottles colour (moist)	Mottles %[1]	Mottles Size[2]	Mottle location[3]	Material[4]	Remarks
33-21	0-21	6/1	6/8	5%	Medium	Matrix	mineral	
21-0	21-33	3/2	4/2	2%	Fine	Matrix	mineral	

[1]Use % area charts; [2]Use size classes; [3]Ped face, pore, within ped along roots, within matrix; [4]Organic (peaty), humic, mineral soil

Hydric soil indicators:

Soil drainage (circle) W MW I P (VP)

Organic layers:
- [ ] Organic soil material
- [✓] Litter
- [ ] Fibric
- [ ] Mesic
- [ ] Humic
- [ ] Peaty topsoil
- [ ] Peaty subsoil

Concretions:
- [✓] Iron concretions
- [ ] Manganese concretions
- [ ] Nodular

Consistence:
- [✓] Plastic
- [ ] Sticky
- [ ] Fluid

Colours: profile form either:
- [✓] Gley OR
- [✓] Mottled

Horizon:
- [ ] Reductimorphic
- [ ] Redox mottled
- [ ] Redox segregations
- [ ] Perch-gley features

Cause of wetness (circle appropriate):

Location: (Depression) Flat Valley Gully Slope

Water table: Depth (cm) ____

High GW (Perched) Seepage Tidal Lithic

Pans: Depth (cm) _____

Pan Humus Fe-pan Densi- Duri- Fragi Ortstein

Layers: Depth (cm) _____

Slow perm argillic

- [✓] Pugged

Hydric soils present? YES [✓] NO [ ] UNCERTAIN [ ] NZSC subgroup _____

Primary hydrology indicators: minimum of 1 required; check all boxes that apply

- [ ] Surface water (1A)
- [ ] Groundwater <30 cm (1B)
- [ ] Soil saturation <30 cm (1C)
- [ ] Water marks (2A)
- [ ] Sediment deposits (2B)
- [ ] Drift deposits (2C)
- [ ] Algal mat/crust (2D)
- [ ] Iron deposits (2E)
- [ ] Surface soil cracks (2F)
- [ ] Inundation on aerial imagery (2G)
- [✓] Sparsely vegetated concave surface (2H)
- [ ] Salt crust (2I)
- [ ] Aquatic invertebrates (2J)
- [ ] Hydrogen sulphide odour (3A)
- [ ] Oxidised rhizosphere on roots (3B)
- [ ] Reduced iron (3C)
- [✓] Reduced iron in tilled soil (3D)
- [ ] High water table stunted/stressed plants (4A)

Secondary hydrology indicators: minimum of 2 required; check all boxes that apply

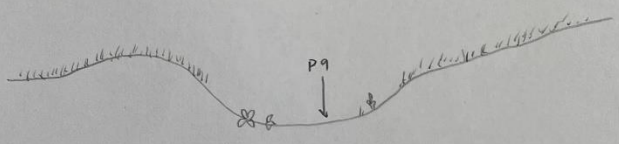
- [ ] Water-stained leaves (2K)
- [ ] Drainage patterns (2L)
- [ ] Dry-season water table (3E)
- [✓] Saturation in aerial imagery (3F)
- [✓] Geomorphic position (4B)
- [ ] Shallow aquitard (4C)
- [ ] FAC-neutral test (4D)
- [ ] Frost-heave hummocks (4E)

FAC-neutral test (4D); refer to Section B: Vegetation

1. No. OBL & FACW dominant species _____(A)
2. No. FACU & UPL dominant species _____(B)
3. Total _____(A+B)
4. FAC-neutral (>50%) _____(A/A+B)*100

Wetland hydrology present? YES [✓] NO [ ]

Sketch of site/soil:



Remarks:

NEW ZEALAND WETLAND DELINEATION DATA FORM

SECTION A – SITE INFORMATION

Site: Homestead Bay | Region: Otago | Sampling point: WA4 - plot 10

Owner: RCL Groups | Date: 3/2/2025 | Land use: cultivated & grazed

Landform: gentle rolling hill country | Local relief: concave | Land cover: exotic grassland

Is the land drained (circle) YES (NO) | Investigator(s): Erin Gallagher | Soil °C: not measured | Slope°: concave

GPS (NZTM): E1265638 N4997579 | Altitude m: 363 | Photo Nos: saved in report folder R7483

Are climatic/hydrologic conditions on the site typical for this time of year? YES NO (circle appropriate; if NO explain in Remarks)

Are vegetation, (soil) or hydrology significantly disturbed? (circle) | Are 'normal circumstances' present? (circle) (YES) NO

Are vegetation, soil or hydrology naturally problematic? (circle) | Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Hydrophytic vegetation present? YES ☑ NO ☐ | **Is the sampled area within a wetland? YES ☑ NO ☐**

Hydric soils present? YES ☐ NO ☐ → uncertain

Wetland hydrology present? YES ☑ NO ☐

SECTION B – VEGETATION

Use scientific names of plants. Tree Stratum (Plot size:_____)	Absolute % cover	Dominant Species?	Indicator Status	Pasture species?	% cover
1.					
2.					
3.					
4.					
Total cover =					
Sapling/Shrub Stratum (Plot size:_____)					
1.					
2.					
3.					
4.					
5.					
Total cover =					
Herb Stratum (Plot size: 2m²)					
1. Trifolium repens	0.1		FACU	y	0.1
2. Glyceria fluitans	2	y	OBL		
3. Solanum nigram	0.2		FACU		
4. Agrostis capillaris	1	y	FACU	y	1
5. Dysphania pumilio	0.1		None (UPL)		
6.					
7.					
8.					
9.					
10.					
11.					
12.					
20% = 0.68 50% = 1.7 Total cover =	3.4		Total pasture species cover (P) =		1.1

Dominance Test:

No. Dominant Spp. OBL/FACW/FAC (A) 1

Tot. Dominant Spp. across strata (B) 2

% OBL/FACW/FAC (A/B) 50%

Prevalence Index:

Total % cover of:		Multiply by:	
OBL	2	x 1 =	2
FACW	0	x 2 =	0
FAC	0	x 3 =	0
FACU	1.3	x 4 =	5.2
UPL	0.1	x 5 =	0.5
Total	3.4 (A)		7.7 (B)

Prevalence Index (B/A) = 2.26

Hydrophytic vegetation indicators:

- ☐ Dominance Test is >50%
- ☑ Prevalence Index is ≤3.0[1]
- ☐ Morphological adaptations[1] (supporting data in Remarks)
- ☐ Problematic hydrophytic vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?

YES ☐ NO ☐ UNCERTAIN ☑

Remarks:

Uncertain vegetation results. More assessments undertaken.

(P/TVC) ×100 = 32% pasture species

SECTION C – SOIL AND HYDROLOGY

Profile description: (Describe to the depth needed to confirm indicator presence/absence, 30 cm default)

Actual depth (cm)	Depth (cm)	Matrix colour (moist)	Mottles colour (moist)	Mottles %[1]	Mottles Size[2]	Mottle location[3]	Material[4]	Remarks
30-13	0-17	6/1	5/8	5	Fine	Matrix	mineral	
13-0	17-30	3/2	6/2	1	Fine	Matrix	mineral	

[1]Use % area charts; [2]Use size classes; [3]Ped face, pore, within ped along roots, within matrix; [4]Organic (peaty), humic, mineral soil

Hydric soil indicators:

Soil drainage (circle) W MW I P (VP)

Organic layers:
- ☐ Organic soil material
- ☐ Litter
- ☐ Fibric
- ☐ Mesic
- ☐ Humic
- ☐ Peaty topsoil
- ☐ Peaty subsoil

Concretions:
- ☑ Iron concretions
- ☐ Manganese concretions
- ☐ Nodular

Consistence:
- ☑ Plastic
- ☐ Sticky
- ☐ Fluid

Colours: profile form either:
- ☑ Gley OR
- ☐ Mottled

Horizon:
- ☐ Reductimorphic
- ☐ Redox mottled
- ☐ Redox segregations
- ☐ Perch-gley features

Cause of wetness (circle appropriate):

Location: (Depression) Flat Valley Gully Slope

Water table: Depth (cm) ____

High GW Perched Seepage Tidal Lithic

Pans: Depth (cm) _____

Pan Humus Fe-pan Densi- Duri- Fragi Ortstein

Layers: Depth (cm) _____

Slow perm argillic

- ☑ Pugged

Hydric soils present? YES ☑ NO ☐ UNCERTAIN ☐ NZSC subgroup _____

Primary hydrology indicators: minimum of 1 required; check all boxes that apply

- ☐ Surface water (1A)
- ☐ Groundwater <30 cm (1B)
- ☐ Soil saturation <30 cm (1C)
- ☐ Water marks (2A)
- ☐ Sediment deposits (2B)
- ☐ Drift deposits (2C)
- ☐ Algal mat/crust (2D)
- ☐ Iron deposits (2E)
- ☑ Surface soil cracks (2F)
- ☐ Inundation on aerial imagery (2G)
- ☑ Sparsely vegetated concave surface (2H)
- ☐ Salt crust (2I)
- ☐ Aquatic invertebrates (2J)
- ☐ Hydrogen sulphide odour (3A)
- ☐ Oxidised rhizosphere on roots (3B)
- ☐ Reduced iron (3C)
- ☑ Reduced iron in tilled soil (3D)
- ☐ High water table stunted/stressed plants (4A)

Secondary hydrology indicators: minimum of 2 required; check all boxes that apply

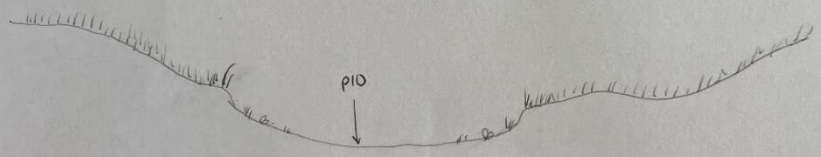
- ☐ Water-stained leaves (2K)
- ☐ Drainage patterns (2L)
- ☐ Dry-season water table (3E)
- ☑ Saturation in aerial imagery (3F)
- ☑ Geomorphic position (4B)
- ☐ Shallow aquitard (4C)
- ☐ FAC-neutral test (4D)
- ☐ Frost-heave hummocks (4E)

FAC-neutral test (4D); refer to Section B: Vegetation

1. No. OBL & FACW dominant species	1 (A)
2. No. FACU & UPL dominant species	1 (B)
3. Total	2 (A+B)
4. FAC-neutral (>50%)	50 (A/A+B)*100

Wetland hydrology present? YES ☑ NO ☐

Sketch of site/soil:



Remarks:

Other species = Chenopodium, Urtica urens, storksbill, foxtail

[Floating sweetgrass]-[marsh foxtail]-[clammy goosefoot] grassland ephemeral wetland

NEW ZEALAND WETLAND DELINEATION DATA FORM

SECTION A – SITE INFORMATION

Site: Homestead Bay
Region: Otago
Sampling point: WA4-plot 11
Owner: RCL Groups
Date: 3/2/2025
Land use: cultivated & grazed
Landform: gentle rolling hill country
Local relief: concave
Land cover: exotic grassland
Is the land drained (circle) YES (NO)
Investigator(s): Erin Gallagher
Soil °C: not recorded Slope°: flat
GPS (NZTM): E1265634 N4997560
Altitude m: 359
Photo Nos: saved in to report folder R7483

Are climatic/hydrologic conditions on the site typical for this time of year? (YES) NO (circle appropriate; if NO explain in Remarks)
Are vegetation, soil or hydrology significantly disturbed? (circle)
Are 'normal circumstances' present? (circle) (YES) NO
Are vegetation, soil or hydrology naturally problematic? (circle)
Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Hydrophytic vegetation present? YES ☐ ☑ NO
Hydric soils present? YES ☐ ☐ NO
Wetland hydrology present? YES ☐ ☐ NO

Is the sampled area within a wetland? YES ☐ NO ☑

SECTION B – VEGETATION

Use scientific names of plants.	Absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:_____)			
1.			
2.			
3.			
4.			
Total cover =			
Sapling/Shrub Stratum (Plot size:_____)			
1.			
2.			
3.			
4.			
5.			
Total cover =			
Herb Stratum (Plot size: 2m²)			
1. Cirsium vulgare	10	y	FACU
2. Cirsium arvense	0.5		FACU
3. Chenopodium album	1		None
4. Lolium perenne	2	y	FACU
5. Trifolium repens	1		FACU
6. Dysphania pumilio	1		None
7. Solanum nigram	1		FACU
8. Urtica urens	1		None
9. Verbascum thapsus	0.5		None
10. Poa annua	2	y	FACU
11. Plantago australis	0.5		FAC
12.			
20% = 4.1 50% = 10.25 Total cover =	20.5		

Dominance Test:
No. Dominant Spp. OBL/FACW/FAC (A) 0
Tot. Dominant Spp. across strata (B) 3
% OBL/FACW/FAC (A/B) 0

Prevalence Index:

Total % cover of:	Multiply by:
OBL 0	x 1 = 0
FACW 0	x 2 = 0
FAC 0.5	x 3 = 1.5
FACU 16.5	x 4 = 66
UPL 3.5	x 5 = 17.5
Total 20.5 (A)	85 (B)

Prevalence Index (B/A) = 4.15

Hydrophytic vegetation indicators:
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological adaptations[1] (supporting data in Remarks)
☐ Problematic hydrophytic vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?
YES ☐
NO ☑
UNCERTAIN ☐

Remarks:

No further assessments required / undertaken.

NEW ZEALAND WETLAND DELINEATION DATA FORM

SECTION A – SITE INFORMATION

Site: Homestead Bay | Region: Otago | Sampling point: WA4 - plot 12

Owner: RCL Groups | Date: 3/2/2025 | Land use: grazed pasture

Landform: gentle rolling hill country | Local relief: concave to flat | Land cover: exotic grassland

Is the land drained (circle) YES (NO) | Investigator(s): Erin Gallagher | Soil °C: not recorded Slope°: n/a

GPS (NZTM): E1265607 N4997660 | Altitude m: 362 | Photo Nos: saved in report folder R7843

Are climatic/hydrologic conditions on the site typical for this time of year? (YES) NO (circle appropriate; if NO explain in Remarks)

Are vegetation, soil or hydrology significantly disturbed? (circle) | Are 'normal circumstances' present? (circle) YES NO

Are vegetation, soil or hydrology naturally problematic? (circle) | Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Hydrophytic vegetation present? YES ☐ ☑ NO **Is the sampled area within a wetland? YES** ☐

Hydric soils present? ~~YES~~ ☐ ☐ ~~NO~~ **NO** ☑

Wetland hydrology present? ~~YES~~ ☐ ☐ ~~NO~~

SECTION B – VEGETATION

Use scientific names of plants.	Absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:_____)			
1.			
2.			
3.			
4.			
Total cover =			
Sapling/Shrub Stratum (Plot size:_____)			
1.			
2.			
3.			
4.			
5.			
Total cover =			
Herb Stratum (Plot size: 2m²)			
1. Cirsium vulgare	1		FACU
2. Lolium perenne	4	Y	FACU
3. Trifolium repens	0.5		FACU
4. Solanum nigrum	0.5		FACU
5. Taraxacum officinale	0.1		FACU
6. Malva neglecta	0.5		None
7. Capsella bursa-pastoris	0.1		None
8.			
9.			
10.			
11.			
12.			
20% = 1.34 50% = 3.35 Total cover =	6.7		

Dominance Test:

No. Dominant Spp. OBL/FACW/FAC (A) 0

Tot. Dominant Spp. across strata (B) 1

% OBL/FACW/FAC (A/B) 0

Prevalence Index:

Total % cover of:	Multiply by:
OBL 0	x 1 = 0
FACW 0	x 2 = 0
FAC 0	x 3 = 0
FACU 6.1	x 4 = 24.4
UPL 0	x 5 = 0
Total 6.1 (A)	24.4 (B)

Prevalence Index (B/A) = 4.0

Hydrophytic vegetation indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological adaptations[1] (supporting data in Remarks)
- ☐ Problematic hydrophytic vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?

YES ☐

NO ☑

UNCERTAIN ☐

Remarks:

- No further assessments required/undertaken.

NEW ZEALAND WETLAND DELINEATION DATA FORM

SECTION A – SITE INFORMATION

Site: Homestead Bay | Region: Otago | Sampling point: WAS - plot 13
Owner: RCL Group | Date: 4/2/2025 | Land use: cultivated & grazed.
Landform: gentle rolling hill country | Local relief: slightly concave | Land cover: exotic grassland
Is the land drained (circle) YES (NO) | Investigator(s): Erin Gallagher | Soil °C: not recorded | Slope°: flat
GPS (NZTM): E1265442 N4997888 | Altitude m: 367 | Photo Nos: saved in report folder R7843

Are climatic/hydrologic conditions on the site typical for this time of year? (YES) NO (circle appropriate; if NO explain in Remarks)
Are vegetation, soil or hydrology significantly disturbed? (circle) | Are 'normal circumstances' present? (circle) (YES) NO
Are vegetation, soil or hydrology naturally problematic? (circle) | Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Hydrophytic vegetation present? YES ☐ ☑ NO
Hydric soils present? ~~YES ☐ ☐ NO~~
Wetland hydrology present? ~~YES ☐ ☐ NO~~
Is the sampled area within a wetland? YES ☐ NO ☑

SECTION B – VEGETATION

Use scientific names of plants.	Absolute % cover	Dominant Species?	Indicator Status	Pasture species? % cover
Tree Stratum (Plot size:_____)				
1.				
2.				
3.				
4.				
Total cover =				
Sapling/Shrub Stratum (Plot size:_____)				
1.				
2.				
3.				
4.				
5.				
Total cover =				
Herb Stratum (Plot size: 2m²)				
1. Capella bursa-pastoris	30	y	None (UPL)	
2. Urtica urens	2		None (UPL)	
3. Lolium perenne	1		FACU	y 1
4. Malva neglecta	0.1		None (UPL)	
5. Cirsium vulgare	0.5		FACU	
6. Trifolium repens	0.5		FACU	y 0.5
7. Conium maculatum	0.5		FAC	
8. Rumex obt	0.1		FAC	
9.				
10.				
11.				
12.				
20% = 6.94 50% = 17.35 Total cover =	34.7		Total pasture species cover (P) =	1.5

Dominance Test:
No. Dominant Spp. OBL/FACW/FAC (A) 0
Tot. Dominant Spp. across strata (B) 1
% OBL/FACW/FAC (A/B) 0

Prevalence Index:

Total % cover of:		Multiply by:	
OBL	0	x 1 =	0
FACW	0	x 2 =	0
FAC	0.06	x 3 =	1.8
FACU	2	x 4 =	8
UPL	32.1	x 5 =	160.5
Total	34.7 (A)		170.3 (B)

Prevalence Index (B/A) = 4.91

Hydrophytic vegetation indicators:
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological adaptations[1] (supporting data in Remarks)
☐ Problematic hydrophytic vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?
YES ☐
NO ☑
UNCERTAIN ☐

Remarks:
Other species nearby = MELalp, ROSrub, VERvir, Hordeum sp.

No further assessment required / undertaken.

(P/TVC)x100 = 4% pasture species

NEW ZEALAND WETLAND DELINEATION DATA FORM

SECTION A – SITE INFORMATION

Site: Homestead Bay | Region: Otago | Sampling point: WA6 - plot 14

Owner: RCL Groups | Date: 4/2/2025 | Land use: grazed pasture

Landform: gentle rolling hill country | Local relief: small gully | Land cover: exotic grassland

Is the land drained (circle) YES NO | Investigator(s): Erin Gallagher | Soil °C: not recorded Slope°: concave, flat

GPS (NZTM): E1265260 N4998158 | Altitude m: 317 | Photo Nos: saved in report folder R7483

Are climatic/hydrologic conditions on the site typical for this time of year? (YES) NO (circle appropriate; if NO explain in Remarks)

Are vegetation, soil or hydrology significantly disturbed? (circle) | Are 'normal circumstances' present? (circle) (YES) NO

Are vegetation, soil or hydrology naturally problematic? (circle) | Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Hydrophytic vegetation present? YES ☐ ☑ NO | **Is the sampled area within a wetland? YES** ☐

Hydric soils present? ~~YES ☐ ☐ NO~~ → uncertain | **NO** ☑

Wetland hydrology present? YES ☑ ☐ NO

SECTION B – VEGETATION

Use scientific names of plants.	Absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:_____)			
1.			
2.			
3.			
4.			
Total cover =			
Sapling/Shrub Stratum (Plot size:_____)			
1.			
2.			
3.			
4.			
5.			
Total cover =			
Herb Stratum (Plot size: 2m²)			
1. no vegetation			
2. present within			
3. plot.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
Total cover =			

Dominance Test:

No. Dominant Spp. OBL/FACW/FAC (A) 0

Tot. Dominant Spp. across strata (B) 0

% OBL/FACW/FAC (A/B) 0

Prevalence Index:

Total % cover of:		Multiply by:	
OBL	0	x 1 =	0
FACW	0	x 2 =	0
FAC	0	x 3 =	0
FACU	0	x 4 =	0
UPL	0	x 5 =	0
Total	0 (A)		0 (B)

Prevalence Index (B/A) = 0

Hydrophytic vegetation indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological adaptations[1] (supporting data in Remarks)
- ☐ Problematic hydrophytic vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?

YES ☐

NO ☑

UNCERTAIN ☐

Remarks:

No vegetation within plot.

SECTION C – SOIL AND HYDROLOGY

Profile description: (Describe to the depth needed to confirm indicator presence/absence, 30 cm default)

Actual depth (cm)	Depth (cm)	Matrix colour (moist)	Mottles colour (moist)	Mottles %[1]	Mottles Size[2]	Mottle location[3]	Material[4]	Remarks
30-12	0-12	4/3	4/6	1	Fine	Matrix	mineral	stony layer, hard to dig through.
12-0	12-30	3/2	2/2	5%	Medium	Matrix	mineral	

[1]Use % area charts; [2]Use size classes; [3]Ped face, pore, within ped along roots, within matrix; [4]Organic (peaty), humic, mineral soil

Hydric soil indicators:

Soil drainage (circle) W MW I P VP

Organic layers:
- ☐ Organic soil material
- ☐ Litter
- ☐ Fibric
- ☐ Mesic
- ☐ Humic
- ☐ Peaty topsoil
- ☐ Peaty subsoil

Concretions:
- ☑ Iron concretions
- ☐ Manganese concretions
- ☐ Nodular

Consistence:
- ☑ Plastic merging
- ☐ Sticky
- ☐ Fluid

Colours: profile form either:
- ☐ Gley OR
- ☐ Mottled

Horizon:
- ☐ Reductimorphic
- ☐ Redox mottled
- ☐ Redox segregations
- ☐ Perch-gley features

Cause of wetness (circle appropriate):

Location: Depression Flat Valley Gully Slope

Water table: Depth (cm) ____

High GW Perched Seepage Tidal Lithic

Pans: Depth (cm) _____

Pan Humus Fe-pan Densi- Duri- Fragi Ortstein

Layers: Depth (cm) _____

Slow perm argillic

☑ Pugged only at lowest point

Hydric soils present? YES ☐ NO ☐ UNCERTAIN ☑ NZSC subgroup _____

Primary hydrology indicators: minimum of 1 required; check all boxes that apply

- ☐ Surface water (1A)
- ☐ Groundwater <30 cm (1B)
- ☐ Soil saturation <30 cm (1C)
- ☐ Water marks (2A)
- ☐ Sediment deposits (2B)
- ☐ Drift deposits (2C)
- ☐ Algal mat/crust (2D)
- ☐ Iron deposits (2E)
- ☑ Surface soil cracks (2F)
- ☐ Inundation on aerial imagery (2G)
- ☐ Sparsely vegetated concave surface (2H)
- ☐ Salt crust (2I)
- ☐ Aquatic invertebrates (2J)
- ☐ Hydrogen sulphide odour (3A)
- ☐ Oxidised rhizosphere on roots (3B)
- ☐ Reduced iron (3C)
- ☐ Reduced iron in tilled soil (3D)
- ☐ High water table stunted/stressed plants (4A)

Secondary hydrology indicators: minimum of 2 required; check all boxes that apply

- ☐ Water-stained leaves (2K)
- ☐ Drainage patterns (2L)
- ☐ Dry-season water table (3E)
- ☑ Saturation in aerial imagery (3F)
- ☑ Geomorphic position (4B)
- ☐ Shallow aquitard (4C)
- ☐ FAC-neutral test (4D)
- ☐ Frost-heave hummocks (4E)

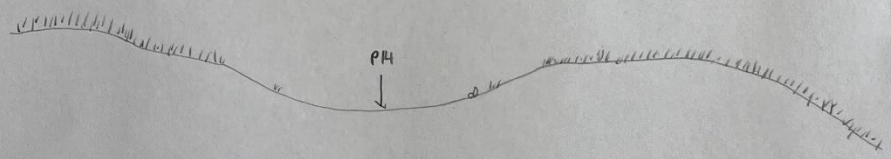
Google Earth 11/2018, 3/2020, 7/2024

FAC-neutral test (4D); refer to Section B: Vegetation

1. No. OBL & FACW dominant species _____(A)
2. No. FACU & UPL dominant species _____(B)
3. Total _____(A+B)
4. FAC-neutral (>50%) _____(A/A+B)*100

Wetland hydrology present? YES ☑ NO ☐

Sketch of site/soil:



Remarks:

Bare soils with sparse vegetation such as LOLper, CHEalb, DYSpum, TRIrep, UPTurc, MALnog, CIRvul

NEW ZEALAND WETLAND DELINEATION DATA FORM

SECTION A – SITE INFORMATION

Site: Homestead Bay | Region: Otago | Sampling point: WA6 - plot 15

Owner: RCL Group | Date: 4/2/2025 | Land use: grazed pasture

Landform: gentle rolling hill country | Local relief: depression | Land cover: exotic grassland

Is the land drained (circle) YES (NO) | Investigator(s): Erin Gallagher | Soil °C: not recorded Slope°: flat / concave

GPS (NZTM): E1265267 N4998140 | Altitude m: 381 | Photo Nos: saved into report folder R7483

Are climatic/hydrologic conditions on the site typical for this time of year? YES NO (circle appropriate; if NO explain in Remarks)

Are vegetation, soil or hydrology significantly disturbed? (circle) Are 'normal circumstances' present? (circle) YES NO

Are vegetation, soil or hydrology naturally problematic? (circle) Explain answers in Remarks if needed

SUMMARY OF FINDINGS—Attach site map showing sampling point locations, transects, important features etc.

Hydrophytic vegetation present? YES ☐ ☑ NO **Is the sampled area within a wetland? YES** ☐

Hydric soils present? ~~YES ☐ ☐ NO~~ **NO** ☑

Wetland hydrology present? ~~YES ☐ ☐ NO~~

SECTION B – VEGETATION

Use scientific names of plants.	Absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
Total cover =			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
Total cover =			
Herb Stratum (Plot size: 2m²)			
1. Chenopodium album	1	y	FACU
2. Malva neglecta	1	y	FACU
3. Trifolium repens	1	y	FACU
4. Lolium perenne	1.5	y	FACU
5. Solanum nigrum	0.5		FACU
6. Capsella bursa-pastoralis	0.5		None (UPL)
7. Erodium cicutarium	1	y	None (UPL)
8.			
9.			
10.			
11.			
12.			
20% = 1.3 50% = 3.25 Total cover =	6.5		

Dominance Test:

No. Dominant Spp. OBL/FACW/FAC (A) 0

Tot. Dominant Spp. across strata (B) 5

% OBL/FACW/FAC (A/B) 0

Prevalence Index:

Total % cover of:		Multiply by:	
OBL	0	x 1 =	0
FACW	0	x 2 =	0
FAC	0	x 3 =	0
FACU	3	x 4 =	12
UPL	3.5	x 5 =	17.5
Total	6.5 (A)		29.5 (B)

Prevalence Index (B/A) = 4.54

Hydrophytic vegetation indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological adaptations[1] (supporting data in Remarks)
- ☐ Problematic hydrophytic vegetation[1]

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present?

YES ☐

NO ☑

UNCERTAIN ☐

Remarks:

No further assessments undertaken / required.

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