

BEFORE THE HEARING PANEL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of the Proposed Waikato District Plan

STATEMENT OF EVIDENCE OF ANDREW RUSSELL BLAYNEY (ECOLOGY)

Dated 17 February 2021

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INTRODUCTION

1. My full name is Andrew Russell Blayney.
2. I am a senior terrestrial ecologist (Associate Principal) at Boffa Miskell Limited, in Hamilton. I have held this role since January 2017. Prior to that date, I was employed by the Bay of Plenty Regional Council as a Subject Matter Expert – Integrated Catchments (February 2016 to December 2016) and Land Management Officer (June 2012 – February 2016). I hold the qualifications of Master of Science – Zoology (1st class Honours), Massey University (2013) and Bachelor of Science - Ecology & Zoology, Massey University (2010). I am a Certified Environmental Practitioner (Certification # 1278) under the Certified Environmental Practitioner Scheme (CEnvP) of the Environmental Institute of Australia and New Zealand.
3. The below selection of projects provides an indication of my experience which is relevant to my evidence:
 - a) Amberfield development – Weston Lea Limited, Hamilton (2017 to present). Terrestrial ecologist for project. I assessed ecological values of the terrestrial vegetation, herpetofauna (lizards), and avifauna (birds) present on site, and the potential effects of the proposed subdivision on those ecological values. I have provided significant input into the design of the proposed methods with which to mitigate potential adverse effects. Presented evidence to Council hearing and Environment Court for this project.
 - b) Ruakura Inland Port (**RIP**) – Tainui Group Holdings, Hamilton (2017 to present). I am the lead project ecologist in the design and implementation of the RIP and associated supporting infrastructure. This includes the assessment and management of fauna, providing ecological input into the development and design of wetlands and

lizard habitat for mitigation, and providing technical advice on ecological constraints and opportunities associated with the project.

- c) Whangarei to Te Hana – Jacobs and Waka Kotahi (New Zealand Transport Agency) indicative and detailed business cases (2017-present). Carried out indicative and detailed business case multi-criteria ecological assessment for Whangarei to Te Hana roading project options for terrestrial and wetland ecology (vegetation, herpetofauna, bats, invertebrates, but excluding avifauna and fish). Project later reframed scope to Whangarei to Port Marsden which I have continued to provide assessment and advice on.
 - d) Te Ahu a Turanga; Manawatū Tararua Highway Project Notice of Requirement - Waka Kotahi (New Zealand Transport Agency) (2019). Terrestrial fauna ecologist for the project who lead the assessment of fauna and their habitat ecological values along the road alignment and the potential effects of the construction of the road along the alignment. Presented evidence to Council hearing for this project.
4. I have been engaged by Shand Properties Limited (**Shand**) as a terrestrial ecologist to prepare a statement of evidence in support of its submission to the Proposed Waikato District Plan which seeks the rezoning of two areas of land in Huntly. Specifically, it seeks to rezone a parcel of land that lies between the North Island Main Trunk Railway and State Highway 1 to industrial zoning (**Area 1**) and a parcel of land that lies between East Mine Road and Russell Road to residential (**Area 6**). My role has been to assess wetlands on the Shand site (**site**) specifically those within Area 6 identified in the proposed zoning plan which is Appendix 1 to **Attachment 1** of my evidence.

5. I am familiar with the site and surrounding environment having visited the site on 6 October 2020. This site visit was undertaken to assess wetland delineation and ecological values within the scope of my evidence.

CODE OF CONDUCT

6. I have read the Environment Court Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2014 and agree to comply with it. I confirm that the opinions expressed in this statement are within my area of expertise except where I state that I have relied on the evidence of other persons. I have not omitted to consider materials or facts known to me that might alter or detract from the opinions I have expressed.

SCOPE OF EVIDENCE

7. My evidence will briefly summarise the findings of the Boffa Miskell (2020) Wetland Delineation and Assessment technical report (**the technical report**) included as **Attachment 1** which used the Ministry for the Environment wetland delineation protocols incorporated in the National Policy Statement for Freshwater (**NPSFW**) to identify the natural inland wetlands within Area 6 of the site. Specifically:
 - a) Delineation of the wetland area within the site;
 - b) Ecological values of the wetland area; and
 - c) Identified land use and activity constraints defined within the National Environmental Standards for Freshwater (**NESFW**) and the NPSFW relevant to the submission.

8. My evidence focuses on my assessment of the ecological values of, and the landuse constraints that apply to, Area 6 which is largely low-lying and contains a large wetland. I have also visually assessed Area 1. However, the vegetation cover is limited to improved pasture and there are no wetlands located there. The proposed future development of Area 1 does not give rise to any ecological issues under the NESFW, or the NPSFW. For that reason, I do not refer to it in my evidence below.

SUMMARY OF EVIDENCE

9. An assessment of Area 6 identified a natural inland wetland feature of 1.84ha which is dominated by non-native vegetation and has medium ecological value.
10. The NPSFW provides that, “The loss of extent of natural inland wetlands is avoided, their values are protected, and their restoration is promoted...”. The NESFW outlines restrictions on activities surrounding wetlands including the discharge or diversion of water within 100m of a wetland.
11. Development in the area surrounding the wetland will impact on the wetland’s hydrology through either diversion or discharge of stormwater. This is likely to require a non-complying resource consent under the NESFW. However, I consider the likely effects of an appropriately managed stormwater discharge would have neutral or positive effect on the wetland. This would be aligned with the intent of the NPSFW.

WETLAND DELINEATION AND ECOLOGICAL VALUE

12. I undertook an assessment of the wetland extent on Area 6 following the methods incorporated in the NPSFW which use a combination of vegetation plots, plant species habitat preferences, hydrology, and soil assessments which allow the accurate demarcation of the wetland edge

when combined with aerial imagery and topographical information. The ecological values of the wetland were assessed following Environmental Institute of Australia and New Zealand (EIANZ) Ecological Impact Assessment Guidelines (2018)¹. The detailed methods and results of this assessment are provided in **Attachment 1**.

13. The delineation exercise determined that the wetland on the site is 1.84 ha in size. A map is provided in Appendix 6 of **Attachment 1** showing the location of the wetland. I consider the wetland to be a “natural inland wetland” as defined by the NPSFW². I note that the ‘natural wetland’ definition under the NPSFW has the same meaning under the NESFW. The wetland is largely delineated by a drain around the outside edge but in a couple of areas the wetland boundary extends beyond the perimeter drain.
14. All survey plots supported this delineation except one, Plot 15, where recent disturbance had modified the soil, resulting in pooling of water in one discrete area adjacent to the wetland. I consider the vegetation and hydrology in this area to be unstable, and the result of the recent soil disturbance. On that basis, I have not included this small area within the assessment of wetland delineation.
15. The wetland is overwhelmingly dominated by exotic, invasive plant species with reed sweet grass (*Glyceria maxima*) forming the dominant ground cover and grey willow (*Salix cinera*) forming the dominant canopy cover. The little native vegetation which exists is of a low diversity and a minor component of the vegetation assemblage.
16. The exotic plant dominance within the wetland is typical of degraded wetland fragments within the wider area however, compared to many of

¹ Roper-Lindsay, J., S. A. Fuller, S. Hooson, M. D. Sanders, and G. T. Ussher. 2018. Ecological Impact Assessment (EclA). EIANZ Guidelines for Use in New Zealand: Terrestrial and Freshwater Ecosystems. 2nd ed. Melbourne: EIANZ.

² NPSFW, clause 3.21: “Natural inland wetland means a natural wetland that is not in the coastal marine area”.

the wetland fragments within the Waikato region, the wetland is relatively large. These factors combined with the importance and priority of protecting wetlands, both nationally and regionally, means that I have assessed the ecological value as Medium under the EIANZ (2018) guidelines.

LAND USE CONSTRAINTS WITHIN AND SURROUNDING THE IDENTIFIED WETLAND

17. The NESFW came into force in September 2020. The NESFW prescribes standards for natural wetlands and activity statuses for vegetation clearance, earthworks or land disturbance, and the taking, use, damming, diversion, or discharge of water within or near a wetland. I consider that regulations 52, 53, and 54 of the NESFW apply to the natural wetland area in Area 6. These regulations are provided in full in **Attachment 1**. I note that the controls specified in regulations 52 to 54 of the NESFW align with clause 3.22(1) of the NPSFW: “The loss of extent of natural inland wetlands is avoided, their values are protected, and their restoration is promoted...”.³
18. The NESFW restrictions on activities within and around the wetland are prescriptive and unambiguous. The discharge of water within a 100m setback from a natural wetland is a non-complying activity under regulations 52(2) and 54(c). In the context of this submission, which is to rezone an area for residential development, it is useful to say more about this non-complying activity status.
19. Area 6 is bisected by the wetland and only a limited area is beyond the 100m setback of the wetland extent. Residential development within 100m of a natural wetland, and within the wetland’s catchment, would either

³ The exceptions listed in clause 3.22 do not apply to residential development unless it is specified infrastructure under the Regional Policy Statement or Regional Plan.

have to discharge water to, or divert water away from, the wetland. The latter would likely cause some degree of drainage or altered hydrology resulting in a change to the extent or values of the wetland, triggering the need to obtain a non-complying resource consent. In this situation, I consider that a discharge of water from within the catchment to the wetland is preferable, and the effects of a discharge of water from residential development would be either neutral or positive, assuming the volume and flow rates are equivalent to baseline condition and water quality is of equal or better quality than baseline.

20. In the case where land use is changed from agricultural to residential, and where stormwater is managed appropriately, I consider that the assumptions stated above are achievable. From an ecological perspective, such a discharge would align with the intent of the NPSFW as it would result in no loss of extent or values of the wetland.

CONCLUSION

21. I have assessed Area 6 within the Shand site using the NPSFW wetland delineation methods and determined that the 1.84 ha wetland feature meets the definition of a natural inland wetland. Non-native, invasive plants dominate the wetland vegetation, and the feature has a medium ecological value.
22. As any residential development surrounding a wetland will either have to discharge or divert stormwater, a non-complying resource consent will likely be required under the NESFW. However, I have considered the likely effects of a stormwater discharge from residential development and in my opinion an appropriately managed discharge would have a neutral or positive effect on the wetland assuming the volume and flow rates are

equivalent to baseline condition and water quality is of equal or better quality than baseline.

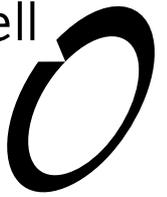
Andrew Russell Blayney

17 February 2021

Attachment 1

Wetland Delineation and Assessment Report

Boffa Miskell



Shand Properties Wetland

Wetland Delineation and Assessment
Prepared for Shand Properties Limited

16 October 2020



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Appendix 2: Wetland delineation protocols Ministry for the Environment

Appendix 3: A vegetation tool for wetland delineation in New Zealand. Clarkson 2013

Appendix 4: Scottburn_8a.1 Soil factsheet

Appendix 5: Utuhina_17a.2 Soil factsheet

Appendix 6: Shand Properties Wetland extent and plot map

Appendix 7: Shand Properties wetland delineation plot sheets

Appendix 8: Shand Properties Limited Plant species list

1.0 Introduction

Shand Properties Limited have made a submission on the Proposed District Plan for two areas in the northern-Huntly area. As depicted in the preliminary zoning plan provided in Appendix 1; Area 6 is proposed to be rezoned for residential use and Area 1 is proposed to be rezoned for industrial use. The vegetation cover of Area 1 is restricted to improved pasture with no wetlands. Area 6 lies between Russell Road and East Mine Road and consists of a large wetland and associated low-lying areas.

With the National Environmental Standards for Freshwater 2020 (NESFW) and the National Policy Statement for Freshwater Management 2020 (NPSFW) coming into force on 7 September, it is important to accurately assess and demarcate wetlands and low-lying areas to ensure proposed development complies with the NES/NPSFW.

1.1 Scope

Boffa Miskell was engaged to assess the low-lying areas and wetlands of Area 6 within the Shand Properties Limited site (hereafter referred to as “the site”) and provide a delineation of the natural inland wetlands in the area following the Ministry for the Environment wetland delineation protocols incorporated in the NPSFW. This assessment also provides guidance on the works and activities that can be conducted within and surrounding these areas in relation to the NES/NPSFW.

Note on the NES/NPSFW; we have interpreted the legislation and conducted this assessment on our understanding of the content and intent of this legislation. However, the recency of the legislation and policy statement means there has been no further guidance from local government or professional bodies that often support ecological assessments.

2.0 Methods

2.1 Wetland vegetation and delineation

The wetland delineation method followed the protocols outlined by the Ministry for the Environment (2020) which is incorporated within the NPSFW and provided for ease of reference in Appendix 2. This method relies on vegetation plot sampling and hydrophytic vegetation determination tool outlined within Clarkson (2013) as well as an assessment of the presence of hydric soils and wetland hydrology. Clarkson (2013) is provided as Appendix 3. The wetland indicator rating status for each plant species follows Clarkson et al. (2013) which is also provided within Appendix 9 of Clarkson (2013) (provided within this report as Appendix 3). Where an indicator rating is not provided, a score was assigned based on habitat preference for the plant species (this only occurred for upland pasture weeds which were classified as UPL). The meaning of these classifications are as follows (taken from Clarkson (2013)):

- 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 (estimated 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)

The minor deviations from the methods prescribed or areas where our interpretation has been qualified are as follow;

- Where there was standing water in drains, we carried out informal surveys of the vegetation to provide a brief description of the hydrophytic vegetation within the drain area. These were carried out where there was clear wetland vegetation and prevented the need to stake out plots within standing water that were not needed to determine the wetland extent (as they are able to be visually assessed to pass the rapid test) or determine ecological value.
- Very few plots included a tree or sapling/shrub stratum. Where trees and shrubs did occur; they were almost universally small saplings or larger multi-stemmed grey willow (*Salix cinera*) with a diameter at breast height at or very close to 10cm for each stem. Therefore, in several plots the tree and sapling/shrub strata were combined. Where this has occurred, the plot size used was the larger 10m circular plot directed for the tree stratum.
- As this area has a long history of disturbance and productive agriculture land use, the whole area could be considered significantly disturbed and be problematic for wetland delineation following the NPS protocols. Therefore, our interpretation of significantly disturbed was where there were clear and recent indicators of disturbance to the soil or hydrology rather than an alternative wider interpretation of historic land use change and disturbance.
- The two soil types found within the assessment area are both highly organic, poorly draining loamy peat. It is very difficult to determine the presence of hydric soils within these soil types. We do not consider that this has been a barrier to being able to delineate wetland areas within the assessment area as the hydrophytic vegetation tool has provided clear results. However, soil saturation in this area can occur outside of wetland areas and an assessment during or after a heavy rain event may result in a different visual assessment of the presence of hydric soils. These soils are also prone to pooling and becoming impermeable when disturbed and therefore can pool water in the absence of wetland hydrology.

The final mapping of the wetland then used the plot information, contours and vegetation types to delineate the wetland.

2.1.1 Desktop review

Existing information relating to this area was reviewed to inform the approach to the ecological assessment, the initial assessment on putative wetland area, and determine the wider ecological context of the site.

Key sources of information reviewed included:

- Significant natural areas of the Waikato District: terrestrial and wetland ecosystems (van der Zwan & Kessels, 2017);
- S-Map Online (<https://smap.landcareresearch.co.nz/>) – online viewer for soil type information.
- Aerial imagery to determine putative wetland extent based on visibly different vegetation types.

2.2 Assessing the Ecological Value

The assessment of the ecological value of the wetland follows the Environmental Institute of Australia and New Zealand (EIANZ) Impact Assessment Guidelines (EIANZ, 2018).

For the wetland, we have assigned ecological value based on the matters to be considered when assigning ecological value outlined in Table 1.

Table 1. Guidelines for assessing ecological value to ecosystems/habitats (adapted from EIANZ (2018)).

Matter	Assessment matters considered; terrestrial and wetlands
Representativeness	<p>Criteria for representative vegetation and habitats:</p> <ul style="list-style-type: none"> • Typical structure and composition • Indigenous species dominate • Expected species and tiers are present • Thresholds may need to be lowered where all examples of a type are strongly modified <p>Criteria for representative species and species assemblages:</p> <ul style="list-style-type: none"> • Species assemblages that are typical of the habitat • Indigenous species that occur in most of the guilds expected for the habitat type
Rarity/distinctiveness	<p>Criteria for rare/distinctive vegetation and habitats:</p> <ul style="list-style-type: none"> • Naturally uncommon, or induced scarcity • Amount of habitat or vegetation remaining • Distinctive ecological features • National priority for protection <p>Criteria for rare/distinctive species or species assemblages:</p> <ul style="list-style-type: none"> • Habitat supporting nationally Threatened or At-Risk species, or locally uncommon species • Regional or national distribution limits of species or communities • Unusual species or assemblages • Endemism
Diversity and pattern	<ul style="list-style-type: none"> • Level of natural diversity, abundance and distribution • Biodiversity reflecting underlying diversity • Biogeographical considerations – pattern, complexity • Temporal considerations, considerations of lifecycles, daily or seasonal cycles of habitat availability and utilization.

Matter	Assessment matters considered; terrestrial and wetlands
Ecological context	<ul style="list-style-type: none"> • Site history, and local environmental conditions which have influenced the development of habitats and communities • The essential characteristics that determine an ecosystem’s integrity, form, functioning, and resilience (from “intrinsic value” as defined in RMA) • Size, shape and buffering • Condition and sensitivity to change • Contribution of the site to ecological networks, linkages, pathways and the protection and exchange of genetic material • Species role in ecosystem functioning – high level, key species identification, habitat as proxy

Table 2: Criteria for assigning ecological value to terrestrial and freshwater habitats and species (modified from EIANZ (2018))

ECOLOGICAL VALUE	SPECIES	TERRESTRIAL VEGETATION & HABITATS
Very High	Threatened - (Nationally Critical, Nationally Endangered, Nationally Vulnerable)	Area rates High for 3 or all of the four assessment matters listed in Table 1. Likely to be nationally important and recognised as such.
High	At Risk - (Declining)	Area rates High for 2 of the assessment matters, Moderate and Low for the remainder, or Area rates High for 1 of the assessment matters, Moderate for the remainder. Likely to be regionally important and recognised as such.
Medium	At Risk - (Recovering, Relict, Naturally Uncommon) Locally (Ecological District) uncommon or distinctive species	Area rates High for one matter, Moderate and Low for the remainder, or Area rates Moderate for 2 or more assessment matters Low or Very Low for the remainder. Likely to be important at the level of the Ecological District.
Low	Native - Not Threatened. Nationally and locally common indigenous species.	Area rates Low or Very Low for majority of assessment matters and Moderate for one. Limited ecological value other than as local habitat for tolerant native species.
Negligible	Exotic species, including pests, species having recreational value.	Area rates Very Low for 3 matters and Moderate, Low or Very Low for remainder.

3.0 Results

3.1 Site description and ecological context.

The Shand Properties Limited site is located in the Meremere ecological district which was historically dominated by kauri forest, podocarp forest, and large areas of wetland in the Waikato River flood plains area. Significant vegetation loss has occurred historically in the ecological district with indigenous vegetation remaining in less than 10% of the district. Much of this remnant area occurs in the large Whangamarino wetland in the north of the District.

The area surrounding the site has a long history of significant land use change and disturbance including landfill sites, coal mines, and wastewater-treatment plants and therefore little to no remnant indigenous vegetation remains.

The two soil types in the wetland area and plot locations are both very poorly drained deep loamy peats and are classified as Scottburn_8a.1 & Utuhina_17a.2. The Landcare Research factsheets for these soil types are provided in Appendix 4 and 5 respectively.

3.2 Wetland vegetation and delineation

Wetland plots were conducted during a site visit on 6 October 2020 and the results for the wetland plots are provided below in Table 3. The locations of the plots and resulting wetland extent are mapped in Appendix 6. The wetland has an area of 1.8354 ha and meets the NPSFW definition of a natural inland wetland and therefore a natural wetland under the NESFW.

Field sheets for all plots are provided in Appendix 7. Several representative photos of the plots are provided below in Figure 1 to Figure 6.

The wetland is largely delineated by an artificial drain encircling the wetland area, the only location where this pattern deviates is in the vegetation type assessed within Plot 11 which is isolated from the main wetland by a recent drain (as indicated as "Drain through wetland – recent" in the map in Appendix 6) and then north of this area in the area assessed by Plot 14 where a local depression creates a small soft sedge (*Juncus effusus*) dominated seepage wetland.

The drain has been included in the wetland extent except for the north west reach where it continues beyond the wetland extent. The drain in the Plot 2A area has been included in the wetland extent as it is wide and flat and contains a high cover of wetland plant species and is considered to be appropriately classified as a linear wetland. This is compared to the drain extending to the northwest which is more incised and defined and subsequently excluded from the wetland extent.

Table 3: Shand property limited Wetland plot results summarised.

Plot	Rapid test	Dominance test	Prevalence Index score	Wetland Hydrology present?	Hydric soil present?	Is plot within a wetland?	Notes
Plot 1	Fail	Fail	4.96	No	No	No	
Plot 2	Fail	Fail	3.2	Yes	No	No	
Plot 2A	Pass	NA	NA	NA	NA	Yes - drain	Informal drain vegetation survey
Plot 3	Fail	Fail	3.88	No	No	No	
Plot 4	Fail	Fail	4.16	Yes*	No	No	Water seeping to wetland
Plot 4A	Yes	NA	NA	Yes	Yes	Yes	
Plot 5	Fail	Fail	3.6	No	No	No	
Plot 6	Fail	Pass	NA	Yes	Yes	Yes - Drain	
Plot 7	Fail	Pass	NA	Yes	Yes	Yes	
Plot 8	Fail	Pass	NA	Yes	Yes	Yes	
Plot 8A	Pass	NA	NA	Yes	Yes	Yes	
Plot 9	Fail	Yes – All FAC	3.57	No	No	No	
Plot 10	Pass	NA	NA	Yes	Yes	Yes	
Plot 11	Pass	NA	NA	Yes	Yes	Yes	
Plot 12	Fail	Fail (50% FAC)	3.9	No	No	No	
Plot 13	Fail	Fail	5	No	No	No	
Plot 14	Fail	Fail (50% FACW)	2.9	Yes	Yes	Yes	
Plot 14a	Pass	NA	NA	Yes	Yes	Yes – Drain	Drain
Plot 15	Pass	NA	NA	Yes	?	Yes – problematic	Recent earthworks causing pooling.



Figure 1: Plot 1 - pasture dominated upland plot.



Figure 2: Plot 2 – damp pasture dominated upland plot with some FACW and FAC species.



Figure 3: Plot 7 – interior of wetland plot *Glyceria maxima* dominated ground cover with stands of grey willow and occasional swamp *Coprosma* (*Coprosma tenuicaulis*).



Figure 4: Plot 8 – edge of wetland plot lacking tree or shrub cover dominated by sedges and grasses.



Figure 5: Plot 11 – Outside of ring drain around wetland - >99% *Glyceria maxima* cover.



Figure 6: Plot 14 – Pasture area with high dominance of FACW species resulting in wetland classification. Plot is within a small depression area.

Plot 15 was problematic in the determination of wetland extent. This plot area had been affected by recent earthworks which caused a small local depression. The working of the loamy peat soil

had caused it to create an impermeable surface soil layer. This local depression is on the top of a small rise used for vehicle access. As a result, water had pooled in the location during winter and wetland plant species had colonised the bare soil/wet area. This small artificial pool had not been created intentionally and is surrounded by upland vegetation types.

As such, we have not included this area in the determination of wetland extent, and we consider that the wetland plant community found is not stable, nor are the hydrological conditions likely to exist beyond the short term. It is most likely that pasture species will take over this area as the soil becomes more permeable due to cracking and root intrusion. A photograph of the plot and a photo of the context of the area in relation to the wetland is provided in Figure 7 and Figure 8 respectively.



Figure 7: Plot 15 – Disturbed area where earthworks have caused local pooling of winter.



Figure 8: Plot 15 – Context looking towards wetland – drain around wetland in background and upland pasture vegetation between plot and drain (Plot 14 was located directly behind person in hi-viz vest and Plot 3 is to the right of the photo extent).

3.3 Wetland vegetation

The wetland mapped is dominated by a reed sweet grass (*Glyceria maxima*) ground cover with grey willow occurring in patches. Swamp *Coprosma* also occurs sporadically and is the sole canopy cover in a small area. There are discrete patches of Baumea, jointed Baumea, and *Carex* species sporadically through the wetland. Occasional kiokio and swamp kiokio occur within the grey willow and Swamp *Coprosma* canopy around the bases of trees. Royal fern, which had only just begun emerging at the time of survey and thus harder to detect, was common throughout the wetland. Overall, the wetland vegetation was overwhelmingly dominated by exotic, invasive, plant species and the little native vegetation which exists is a minority component of the vegetation assemblage.

The pasture vegetation immediately surrounding the wetland and the low-lying flats to the north of the wetland consisted of a variable cover of pasture grasses and soft rush. Higher areas consisted of rye grass dominated pasture. The species list and threat status for plants found while onsite is provided in Appendix 8.

4.0 Assessment of Ecological Value

The wetland has moderate representativeness as the species assemblage is typical of the degraded wetland fragments of the area. It has moderate rarity and distinctiveness as despite

its degraded state it is a reasonably large wetland that has high priority for protection regionally and nationally. Diversity and pattern are low due to exotic dominance of a depauperate species assemblage. It also scores moderate for ecological context as, despite the wetland scoring low for most assessment matters considered within this criterion, it is a large wetland of a compact shape in the context of wetland fragments in the Waikato Region.

Overall, the wetland area is of medium ecological value when considering the matters to be considered under the EIANZ (2018) guidelines.

5.0 Land use constraints within and surrounding identified wetland.

The land use constraints within and surrounding the mapped wetland extent are outlined within Part 3, subpart 1 of the NESFW. Relevant to this Proposed District Plan submission are Sections 52, 53, and 54. These sections are as follows;

Drainage of natural wetlands

52; Non-complying activities

- 1) Earthworks outside, but within a 100 m setback from, a natural wetland is a non-complying activity if it—
 - a) results, or is likely to result, in the complete or partial drainage of all or part of a natural wetland; and
 - b) does not have another status under any of regulations 38 to 51.
- 2) The taking, use, damming, diversion, or discharge of water outside, but within a 100 m setback from, a natural wetland is a non-complying activity if it—
 - a) results, or is likely to result, in the complete or partial drainage of all or part of a natural wetland; and
 - b) does not have another status under any of regulations 38 to 51.

53 Prohibited activities

- 1) Earthworks within a natural wetland is a prohibited activity if it—
 - a) results, or is likely to result, in the complete or partial drainage of all or part of a natural wetland; and
 - b) does not have another status under any of regulations 38 to 51.
- 2) The taking, use, damming, diversion, or discharge of water within a natural wetland is a prohibited activity if it—
 - a) results, or is likely to result, in the complete or partial drainage of all or part of a natural wetland; and
 - b) does not have another status under any of regulations 38 to 51.

Other activities

54; Non-complying activities

The following activities are non-complying activities if they do not have another status under this subpart:

- a) vegetation clearance within, or within a 10 m setback from, a natural wetland;
- b) earthworks within, or within a 10 m setback from, a natural wetland;
- c) the taking, use, damming, diversion, or discharge of water within, or within a 100 m setback from, a natural wetland.

This aligns with the NPSFW Section 3.22 “The loss of extent of natural inland wetlands is avoided, their values are protected, and their restoration is promoted, except where” (exceptions listed do not apply to residential development unless it is specified infrastructure under the Regional Policy Statement or Regional Plan).

6.0 Recommended management

We recommend that any development within the area aligns with the NPS/NES FW, including avoiding the wetland and any activities that may impact on the wetland’s integrity and hydrology. Restoration of the wetland as an ecologically valuable habitat is an option and activities relating to restoration of natural wetlands are permitted under section 38 of the NESFW. The degradation and high dominance of invasive exotic plants means that any restoration attempts will need to occur over a long time period and follow advice from an experienced restoration ecologist.

7.0 Conclusions

The assessment carried out of the Shand Properties Limited property delineated 1.8354 ha wetland of Medium ecological value. This area meets the definition of a natural inland wetland under the NPS/NES FW and therefore the constraints on complying activities outlined within the NESFW apply to the wetland and surrounding area.

8.0 References

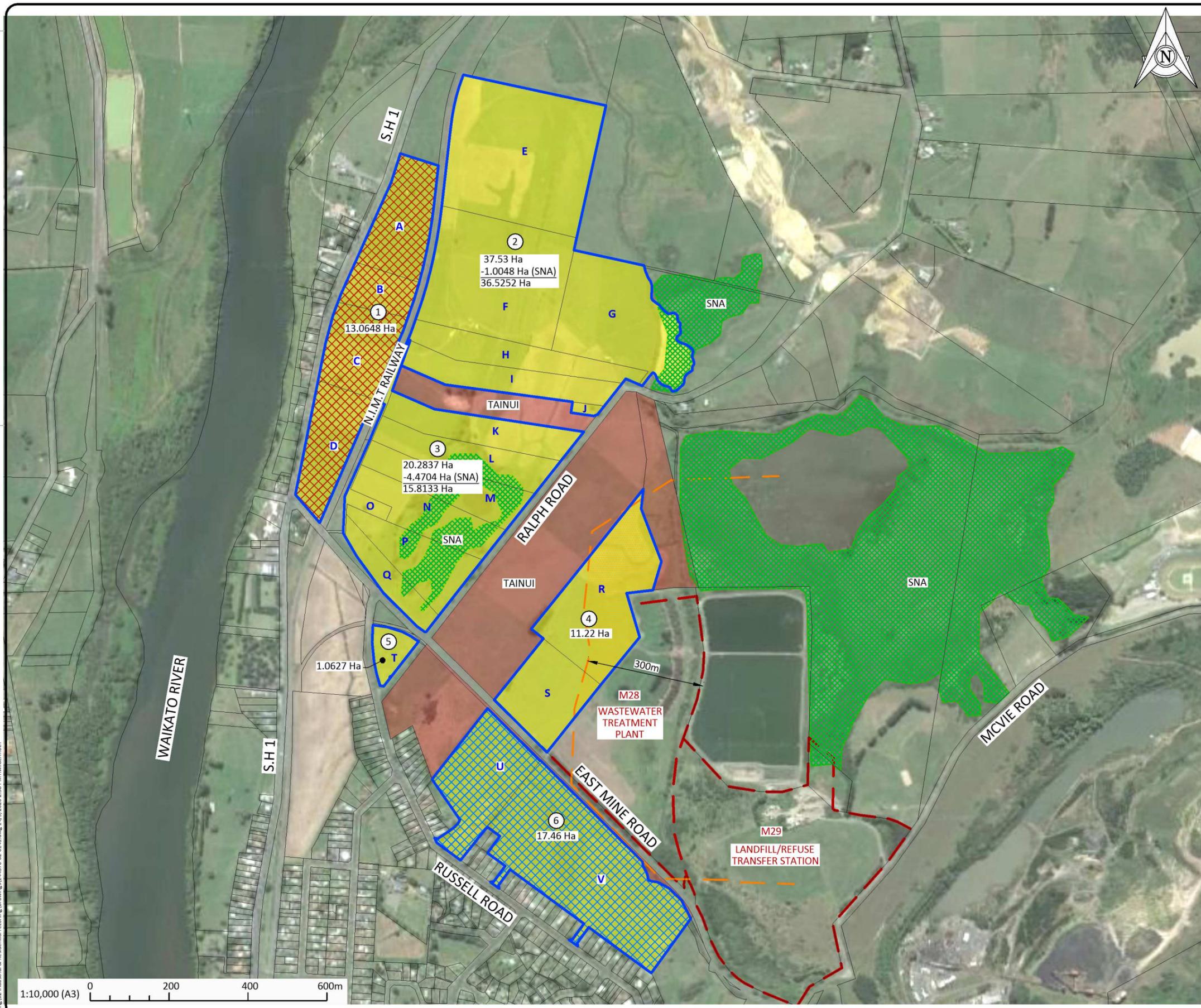
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Appendix 1: Zoning Plan

100mm

SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY

K:\144370\Shand Properties Rezoning\02_Industrial & Residential Rezoning\Drawing\144370-02-0141.dwg 14/09/2020 2:58 PM\hwiddermoh



1:10,000 (A3) 0 200 400 600m

KEY:

- SIGNIFICANT NATURAL AREA (SNA)
- SHAND PROPERTIES
- AREA TO BE REZONED RESIDENTIAL
- AREA TO BE REZONED INDUSTRIAL
- TAINUI
- DESIGNATION
- 300m BUFFER

AREA SCHEDULE					
ID	SHOWN	DESCRIPTION	RECORD OF TITLE	AREA	
1	A	LOT 2 DPS 12402	SA9C/63, SA40C/873	4.0494 Ha	
	B	LOT 1 DPS 12402	SA43C/865, SA40C/873	1.8006 Ha	
	C	PT LOT 12 DP 24355	SA43C/865, SA40C/873	3.5911 Ha	
	D	LOT 11 DP 24355	SA43C/866	3.6237 Ha	
2	E	ALLOTMENT 22 TAUPIRI PARISH	SA9C/63, SA40C/873		
	F	PT ALLOTMENT 21 TAUPIRI PARISH	SA9C/63, SA40C/873		
	G	PT ALLOTMENT 18 TAUPIRI PARISH	SA9C/63, SA40C/873		
	H	LOT 1 DP 23455	SA1086/107, SA40C/873	3.5640 Ha	
	I	LOT 2 DP 23455	SA1086/107, SA40C/873	3.5190 Ha	
	J	LOT 1 DPS 9628	SA34A/500	0.2023 Ha	
	3	K	LOT 4 DP 23455	SA43C/880	3.5185 Ha
		L	LOT 5 DP 23455	SA60D/753, SA40C/873	3.5190 Ha
M		LOT 6 DP 23455	SA60D/753, SA40C/873	3.5190 Ha	
N		LOT 7 DP 23455	SA60D/753, SA40C/873	3.5190 Ha	
O		LOT 10 DP 23455	SA60D/753, SA40C/873	0.8251 Ha	
P		LOT 8 DP 23455	SA33A/479, SA40C/873	3.4998 Ha	
Q		PT LOT 9 DP 23455	SA33A/479, SA40C/873	1.8833 Ha	
4	R	PT ALLOTMENT 16 TAUPIRI PARISH	SA1783/11, SA43C/878	7.2584 Ha	
	S	PT ALLOTMENT 12 TAUPIRI PARISH	SA1298/46	3.7356 Ha	
5	T	PT LOT 23 DP 23455	SA43C/870	1.0627 Ha	
6	U	LOT 2 DPS 33575	SA43C/876	5.0730 Ha	
	V	PT ALLOTMENT 11 TAUPIRI PARISH	SA2B/843, SA26B/948,	5.0730 Ha	

DATE	ISSUE/REVISION DETAIL	BY	CHK	APPR
14.09.2020	AREA 2 - AMEND ZONING	HW	CD	-
09.09.2020	UPDATE AREAS TO BE REZONED	HW	CD	-
21.01.2020	INITIAL ISSUE	HW	CD	-

DESIGNED	CHECKED
-	CD
DRAWN	APPROVED
HW	-



CLIENT
SHAND PROPERTIES

PROJECT
PROPOSED DISTRICT PLAN REZONING

DRAWING
LAND HOLDING PLAN

STATUS	
PRELIMINARY	
DATE	SCALE (ORIGINAL SIZE A3)
14.09.2020	1:10,000
DRAWING NUMBER	REVISION
144370-02-0141	C

Appendix 2: Wetland delineation protocols

Ministry for the Environment

Available: <https://www.mfe.govt.nz/sites/default/files/media/Fresh%20water/wetland-delineation-protocols.pdf>

Appendix 3: A vegetation tool for wetland delineation in New Zealand. Clarkson 2013

Available: https://www.landcareresearch.co.nz/uploads/public/Discover-Our-Research/Biodiversity/Species-ecosystem-services/Restoring-wetland-ecosystem-functioning/vegetation_tool_wetland_delineation.pdf?vid=6delineation.pdf

Appendix 4: Scottburn_8a.1 Soil factsheet

Scottburn_8a.1

Report generated: 15-Oct-2020 from <https://smap.landcareresearch.co.nz>

Scot_8a.1 (70% of the mapunit at location (1791478, 5843481), Confidence: High)

This information sheet describes the typical average properties of the specified soil to a depth of 1 metre, and should not be the primary source of data when making land use decisions on individual farms and paddocks. S-map correlates soils across New Zealand. Both the old soil name and the new correlated (soil family) name are listed below.

Capture of the base soil information in this region was funded by Environment Waikato, Manaaki Whenua and MPI.

Soil Classification

Soil Classification:

Acid Humic Organic Soils (OHA)

Family Name:

Scottburn (Scot)

Sibling Name:

Scottburn_8a.1 (Scot_8a.1)

Soil profile material

Organic layered or stony

Profile texture

loamy peat

Parent Material

Stones/rocks
not applicable

Depth class (diggability)

Deep (> 1 m)

Soil material
rhyolitic rock

Origin

Peat

Soil Sibling Concept

This soil belongs to the Organic soil order of the New Zealand soil classification. Organic Soils are formed in the partly decomposed remains of wetland plants (peat) or forest litter. Some mineral material may be present but the soil is dominated by organic matter. It is formed in peat, from rhyolite parent material.



Allan Hewitt ©

**Humic
Organic**

About this publication

- This information sheet describes the *typical average properties* of the specified soil.
- For further information on individual soils, contact Landcare Research New Zealand Ltd: www.landcareresearch.co.nz
- Advice should be sought from soil and land use experts before making decisions on individual farms and paddocks.
- The information has been derived from numerous sources. It may not be complete, correct or up to date.
- This information sheet is licensed by Landcare Research on an "as is" and "as available" basis and without any warranty of any kind, either express or implied.
- Landcare Research shall not be liable on any legal basis (including without limitation negligence) and expressly excludes all liability for loss or damage howsoever and whenever caused to a user of this factsheet.

Scottburn_8a.1

Soil horizons

Characteristics of functional horizons in order from top to base of profile:

Functional Horizon	Thickness	Stones	Clay*	Sand*	Permeability
Clayey Organic Humic	30 - 35 cm	0 %	35 - 50 %	10 - 20 %	moderately slow
Clayey Organic Humic	15 - 35 cm	0 %	35 - 55 %	10 - 20 %	slow
Loamy Organic Humic	35 - 55 cm	0 %	20 - 40 %	15 - 25 %	moderately slow

* clay and sand percent values are for the mineral fines (excludes stones). Silt = 100 - (clay + sand)

Scottburn_8a.1

Soil physical properties

Depth class (diggability)

Deep (> 1 m)

Potential rooting depth

Unlimited

Rooting barrier

Anoxic conditions

Depth to hard rock

No hard rock within 1 m

Depth to soft rock

No soft rock within 1 m

Depth to stony layer class

No significant stony layer within

Texture profile

Loamy peat

Topsoil stoniness

Stoneless

Topsoil clay range

35 - 50 %

Drainage class

Very poorly drained

Permeability profile

Moderate over slow

Depth to slowly permeable horizon

30 - 35 (cm)

Permeability of slowest horizon

Slow (< 4 mm/h)

Aeration in root zone

Very limited

Profile available water

(0 - 30cm or root barrier)	(0 - 60cm or root barrier)	(0 - 100cm or root barrier)
Very high (135 mm)	Very high (270 mm)	Very high (450 mm)

Dry bulk density

topsoil	subsoil
0.54 g/cm ³	0.54 g/cm ³

Soil chemical properties

Topsoil P retention

High (62%)

Soil management factors

Vulnerability classes relate to soil properties only and do not take into account climate or management

Soil structure integrity

Structural vulnerability

Pugging vulnerability

not available yet

Septic tank installation category

A1 if slope > 15 deg otherwise B2

Contaminant management

N leaching vulnerability

Very low

P leaching vulnerability

not available yet

Dairy effluent (FDE) risk category

B

Water management

Water logging vulnerability

High

Drought vulnerability - if not irrigated

Low

Bypass flow

High

Hydrological soil group

D

Relative Runoff Potential

SINDI - Soil quality Indicators

SINDI - Soil Quality Indicators

A suite of soil quality indicators is available from <http://sindi.landcareresearch.co.nz/>

- Compare your soil with information from our soils databases.
- Assess the intrinsic resources and biological, chemical and physical quality of your soil
- See how your soil measures up against current understanding of optimal values.
- Learn about the effect each indicator has on soil quality and some general management practices that could be implemented to improve soil quality.

Soil information for OVERSEER

The following information can be entered in the OVERSEER® Nutrient Budget model. This information is derived from the S-map soil properties which are matched to the most appropriate OVERSEER categories. Please read the notes below for further information.

Soil description page

1. Select **Link to S-map**
2. Under S-map sibling data enter the S-map name/ref: **Scot_8a.1**

Considerations when using Smap soil properties in OVERSEER

- The soil water values are estimated using a regression model based on soil order, parent rock, soil functional horizon information (stone content, soil density class), as well as texture (field estimates of sand, silt and clay percentages). The model is based on laboratory - measured water content data held in the National Soils Database and other Manaaki Whenua datasets. Most of this data comes from soils under long-term pasture and may vary from land under arable use, irrigation, etc.
- Each value is an estimate of the water content of the whole soil within the target depth range or to the depth of the root barrier (if this occurs above the base of the target depth). Where soil layers contain stones, the soil water content has been decreased according to the stone content.
- S-map only contains information on soils to a depth of 100 cm. The soil water estimates in the > 60 cm depth category assume that the bottom functional horizon that extends to 100 cm, continues down to a depth of 150cm. Where it is known by the user that there is an impermeable layer or non-fractured bedrock between 100 and 150 cm, this depth should be entered into OVERSEER. Where there is a change in the soil profile characteristics below 100 cm, the user should be aware that the values provided on this factsheet for the > 60 cm depth category will not reflect this change. For example, the presence of gravels at 120 cm would usually result in lower soil water estimates in the > 60 cm depth category. Note though that this assumption only impacts on a cropping block, as OVERSEER uses soil data from just the top 60 cm in pastoral blocks.
- OVERSEER requires the soil water values to be non-zero integers (even though zero is a valid value below a root barrier), and the wilting point value must be less than the field capacity value which must be less than the saturation value. The S-map water content estimates supplied by the S-map web service have been rounded to integers and may be assigned minimal values to meet these OVERSEER requirements. These modifications will result in a slightly less accurate estimate of Available Water to 60 cm (labelled PAW in OVERSEER) than that provided on the first page of this factsheet, but this is not expected to lead to any significant difference in outputs from OVERSEER.

Appendix 5: Utuhina_17a.2 Soil factsheet

Utuhina_17a.2

Report generated: 15-Oct-2020 from <https://smap.landcareresearch.co.nz>

Utuh_17a.2 (30% of the mapunit at location (1791478, 5843481), Confidence: Medium)

This information sheet describes the typical average properties of the specified soil to a depth of 1 metre, and should not be the primary source of data when making land use decisions on individual farms and paddocks. S-map correlates soils across New Zealand. Both the old soil name and the new correlated (soil family) name are listed below.

Capture of the base soil information in this region was funded by Environment Waikato, Manaaki Whenua and MPI.

Soil Classification

Soil Classification:

Mellow Humic Organic Soils (OHM)

Family Name:

Utuhina (Utuh)

Sibling Name:

Utuhina_17a.2 (Utuh_17a.2)

Soil profile material

Organic layered or stony

Profile texture

loamy peat over silt

Parent Material

Stones/rocks
not applicable

Depth class (diggability)

Deep (> 1 m)

Soil material
rhyolitic rock

Origin

Peat on Alluvium

Soil Sibling Concept

This soil belongs to the Organic soil order of the New Zealand soil classification. Organic Soils are formed in the partly decomposed remains of wetland plants (peat) or forest litter. Some mineral material may be present but the soil is dominated by organic matter. It is formed in peat overlying alluvial sand silt or gravel deposited by running water, from hard mudstone parent material.



Allan Hewitt ©

**Humic
Organic**

About this publication

- This information sheet describes the *typical average properties* of the specified soil.
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- Landcare Research shall not be liable on any legal basis (including without limitation negligence) and expressly excludes all liability for loss or damage howsoever and whenever caused to a user of this factsheet.

Utuhina_17a.2

Soil horizons

Characteristics of functional horizons in order from top to base of profile:

Functional Horizon	Thickness	Stones	Clay*	Sand*	Permeability
Loamy Organic Humic, Acidic Tephric	20 - 30 cm	0 %	25 - 40 %	10 - 20 %	moderately slow
Loamy Organic Humic, Acidic Tephric	20 - 40 cm	0 %	25 - 40 %	10 - 20 %	moderately slow
Loamy Fine Firm, Acidic Tephric	30 - 60 cm	0 %	20 - 45 %	15 - 25 %	moderately slow

* clay and sand percent values are for the mineral fines (excludes stones). Silt = 100 - (clay + sand)

Utuhina_17a.2

Soil physical properties

Depth class (diggability)

Deep (> 1 m)

Potential rooting depth

50 - 80 (cm)

Rooting barrier

Anoxic conditions

Depth to hard rock

No hard rock within 1 m

Depth to soft rock

No soft rock within 1 m

Depth to stony layer class

No significant stony layer within

Texture profile

Loamy peat over silt

Topsoil stoniness

Stoneless

Topsoil clay range

25 - 40 %

Drainage class

Poorly drained

Permeability profile

Moderate over slow

Depth to slowly permeable horizon

50 - 80 (cm)

Permeability of slowest horizon

Slow (< 4 mm/h)

Aeration in root zone

Limited

Profile available water

(0 - 30cm or root barrier)

(0 - 60cm or root barrier)

(0 - 100cm or root barrier)

Very high (135 mm)

Very high (255 mm)

Very high (314 mm)

Dry bulk density

topsoil

0.54 g/cm³

subsoil

0.54 g/cm³

Soil chemical properties

Topsoil P retention

High (62%)

Soil management factors

Vulnerability classes relate to soil properties only and do not take into account climate or management

Soil structure integrity

Structural vulnerability

Pugging vulnerability

not available yet

Septic tank installation category

A1 if slope > 15 deg otherwise B2

Contaminant management

N leaching vulnerability

Very low

P leaching vulnerability

not available yet

Dairy effluent (FDE) risk category

B

Water management

Water logging vulnerability

High

Drought vulnerability - if not irrigated

Low

Bypass flow

High

Hydrological soil group

B/D

Relative Runoff Potential

SINDI - Soil quality Indicators

SINDI - Soil Quality Indicators

A suite of soil quality indicators is available from <http://sindi.landcareresearch.co.nz/>

- Compare your soil with information from our soils databases.
- Assess the intrinsic resources and biological, chemical and physical quality of your soil
- See how your soil measures up against current understanding of optimal values.
- Learn about the effect each indicator has on soil quality and some general management practices that could be implemented to improve soil quality.

Soil information for OVERSEER

The following information can be entered in the OVERSEER® Nutrient Budget model. This information is derived from the S-map soil properties which are matched to the most appropriate OVERSEER categories. Please read the notes below for further information.

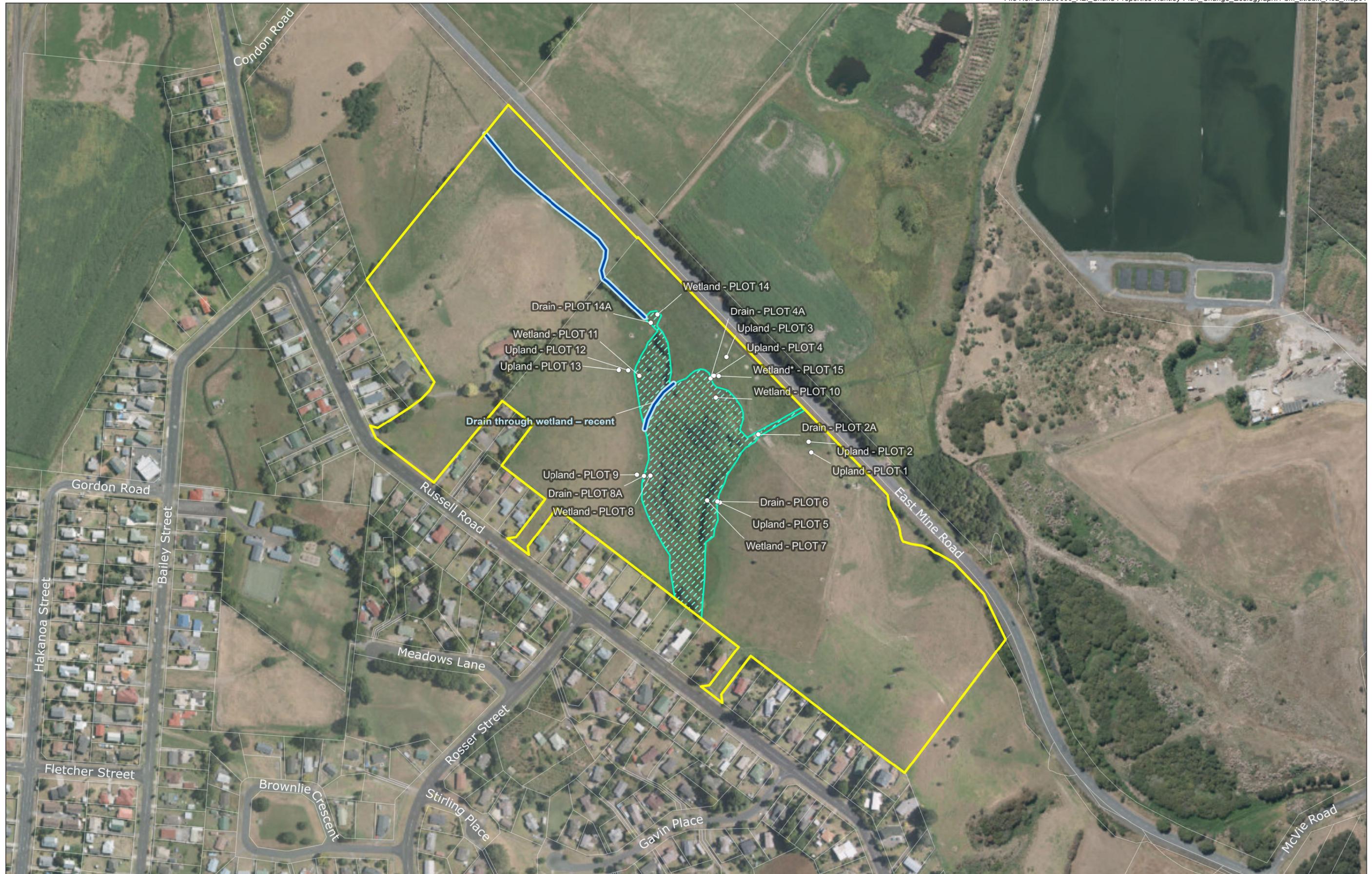
Soil description page

1. Select **Link to S-map**
2. Under S-map sibling data enter the S-map name/ref: **Utuh_17a.2**

Considerations when using Smap soil properties in OVERSEER

- The soil water values are estimated using a regression model based on soil order, parent rock, soil functional horizon information (stone content, soil density class), as well as texture (field estimates of sand, silt and clay percentages). The model is based on laboratory - measured water content data held in the National Soils Database and other Manaaki Whenua datasets. Most of this data comes from soils under long-term pasture and may vary from land under arable use, irrigation, etc.
- Each value is an estimate of the water content of the whole soil within the target depth range or to the depth of the root barrier (if this occurs above the base of the target depth). Where soil layers contain stones, the soil water content has been decreased according to the stone content.
- S-map only contains information on soils to a depth of 100 cm. The soil water estimates in the > 60 cm depth category assume that the bottom functional horizon that extends to 100 cm, continues down to a depth of 150cm. Where it is known by the user that there is an impermeable layer or non-fractured bedrock between 100 and 150 cm, this depth should be entered into OVERSEER. Where there is a change in the soil profile characteristics below 100 cm, the user should be aware that the values provided on this factsheet for the > 60 cm depth category will not reflect this change. For example, the presence of gravels at 120 cm would usually result in lower soil water estimates in the > 60 cm depth category. Note though that this assumption only impacts on a cropping block, as OVERSEER uses soil data from just the top 60 cm in pastoral blocks.
- OVERSEER requires the soil water values to be non-zero integers (even though zero is a valid value below a root barrier), and the wilting point value must be less than the field capacity value which must be less than the saturation value. The S-map water content estimates supplied by the S-map web service have been rounded to integers and may be assigned minimal values to meet these OVERSEER requirements. These modifications will result in a slightly less accurate estimate of Available Water to 60 cm (labelled PAW in OVERSEER) than that provided on the first page of this factsheet, but this is not expected to lead to any significant difference in outputs from OVERSEER.

Appendix 6: Shand Properties Wetland extent and plot map



DRAFT

LEGEND

- Property Extent
- Wetland Points
- Drain
- Wetland

Appendix 7: Shand Properties wetland delineation plot sheets

Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shand Region: Waikato Sampling Date: 6/10/20
 Applicant/Owner: Shand Altitude: ~12m Sampling Point No: Plot 1
 Investigator(s): ABI TUI Nearby town/city: Hatfield
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): ~10
 Latitude: _____ Longitude: GPS #: Plot 1 Datum: WGS 84
 Soil Map Unit Name: Sottburn f (Sib 8) 70% cover Utuhina f (Sib 7) 30% cover
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	
Remarks: <u>Peat soil type problematic in determining hydric soils.</u>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC:	<u>0</u> (A)
2. _____				Total Number of Dominant Species Across All Strata:	<u>1</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>0</u> (A/B)
4. _____					
= Total Cover					
Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:	
1. _____				Total % Cover of:	Multiply by:
2. _____				OBL species <u>0</u>	x 1 = <u>0</u>
3. _____				FACW species <u>0</u>	x 2 = <u>0</u>
4. _____				FAC species <u>2</u>	x 3 = <u>6</u>
5. _____				FACU species <u>0</u>	x 4 = <u>0</u>
= Total Cover				UPL species <u>96</u>	x 5 = <u>480</u>
				Column Totals:	<u>98</u> (A) <u>486</u> (B)
				Prevalence Index = B/A = <u>4.96</u>	
Herb Stratum (Plot size: <u>2x2</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:	
1. <u>LOLpe</u> (P)	<u>95%</u>	<u>Y</u>	<u>UPL</u>	<input checked="" type="checkbox"/> Dominance Test is >50%	
2. <u>Rum obt</u>	<u>1</u>	<u>N</u>	<u>FAC</u>	<input checked="" type="checkbox"/> Prevalence Index is ≤3.0 ¹	
3. <u>Pilosella sp.</u>	<u>1</u>	<u>N</u>	<u>UPL</u>	<input checked="" type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
4. <u>HOL lan</u> (P)	<u>1</u>	<u>N</u>	<u>FAC</u>	<input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)	
5. <u>Others mixed</u>	<u>2</u>	<u>N</u>	<u>—</u>		
= Total Cover				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
				Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	
Remarks: <u>(P) = Pasture sp.</u>					

Adapted from US Army Corps of Engineers

New Zealand – Version 1.0

Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shand Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: Plot 2
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0
 Latitude: _____ Longitude: GPS #: Plot 2 Datum: WGS 84

See plot 1 sheet for information

Soil Map Unit Name: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	Hydic Soil Present? Yes _____ No <input checked="" type="checkbox"/>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: <u>peat soil problematic for determining hydric soils.</u>			

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)
2. _____				Total Number of Dominant Species Across All Strata: <u>3</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33%</u> (A/B)
4. _____				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species <u>0</u> x 1 = _____ FACW species <u>35</u> x 2 = <u>70</u> FAC species <u>10</u> x 3 = <u>30</u> FACU species <u>55</u> x 4 = <u>220</u> UPL species <u>0</u> x 5 = _____ Column Totals: <u>100</u> (A) <u>320</u> (B) Prevalence Index = B/A = <u>3.2</u>
= Total Cover				
Sapling/Shrub Stratum (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
= Total Cover				
Herb Stratum (Plot size: <u>2x2</u>)				
1. <u>JUN eff</u>	<u>35%</u>	<u>Y</u>	<u>FACW</u>	
2. <u>RAN rep</u>	<u>10%</u>		<u>FAC</u>	
3. <u>TKI rep</u> (P)	<u>20%</u>	<u>Y</u>	<u>FACU</u>	
4. <u>POA ann</u> (P-maybe)	<u>35%</u>	<u>Y</u>	<u>FACU</u>	
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
<u>100</u> = Total Cover				
(P) - Pasture sp. Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>				

Remarks: _____

Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shard Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: Plot 2A
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): Drain Local relief (concave, convex, none): W Drain Slope (%): NA
 Latitude: _____ Longitude: GRI # 3 WD 3 Datum: WGS 84

Ref Plot 1 sheet.

Soil Map Unit Name: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: <u>Plot problematic for hydric ID - not problem in drain.</u>			

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A) Total Number of Dominant Species Across All Strata: _____ (B) Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: _____)	1. _____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				
Herb Stratum (Plot size: _____)	1. _____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
_____ = Total Cover				
Hydrophytic Vegetation Indicators: ___ Dominance Test is >50% ___ Prevalence Index is ≤3.0 ¹ ___ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain)				
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____				
Remarks: <u>Informal drain survey. Species present: GLYmax, RANfla, MYK ag, JUNeff, PERhyd, LUDpal, PALdir</u>				

Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shand Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: plot 3
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): terrace/hat Local relief (concave, convex, none): none Slope (%): 0
 Latitude: _____ Longitude: GPS# : plot 3 Datum: WGS 84

Ref. Plot 1 sheet

Soil Map Unit Name: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	
Remarks: <u>Peat soil problematic for hydric determination</u>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)	
2. _____				Total Number of Dominant Species Across All Strata: <u>4</u> (B)	
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>25%</u> (A/B)	
4. _____				Prevalence Index worksheet:	
= Total Cover				Total % Cover of:	Multiply by:
OBL species _____ x 1 = _____				FACW species <u>5</u> x 2 = <u>10</u>	
FAC species <u>22</u> x 3 = <u>66</u>				FACU species <u>50</u> x 4 = <u>200</u>	
UPL species <u>20</u> x 5 = <u>100</u>				Column Totals: <u>97</u> (A) <u>376</u> (B)	
Prevalence Index = B/A = <u>3.88</u>				Hydrophytic Vegetation Indicators:	
X Dominance Test is >50%				X Prevalence Index is ≤3.0 ¹	
X Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)				X Problematic Hydrophytic Vegetation ¹ (Explain)	
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	

Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____			
2. _____			
3. _____			
4. _____			
= Total Cover			

Herb Stratum (Plot size: <u>2x2</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>LOL per</u> (P)	<u>20%</u>	<input checked="" type="checkbox"/>	<u>UPL</u>
2. <u>POA ann</u> (P-maybe)	<u>30</u>	<input checked="" type="checkbox"/>	<u>FACU</u>
3. <u>RAN rep</u> (P)	<u>20</u>	<input checked="" type="checkbox"/>	<u>FAC</u>
4. <u>TRT rep</u> (P)	<u>20</u>	<input checked="" type="checkbox"/>	<u>FACU</u>
5. <u>JUN eff</u>	<u>5%</u>		<u>FACW</u>
6. <u>Rum obt</u>	<u>2%</u>		<u>FAC</u>
7. <u>Other mixed</u>	<u>3%</u>		<u>/</u>
= Total Cover <u>100</u>			

P = Pasture species

Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shand Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: Plot 4
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): Small slope Local relief (concave, convex, none): none Slope (%): 20
 Latitude: _____ Longitude: GPS #: Plot 4 Datum: WGS 84

Ref Plot 1 Sheet

Soil Map Unit Name: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: <u>Peat soil problematic for determining hydric soil. * Seepage to drain</u>			

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)
2. _____				Total Number of Dominant Species Across All Strata: <u>2</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
4. _____				
= Total Cover				
Remarks: <u>NA</u>				
Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. _____				Total % Cover of: _____ Multiply by: _____
2. _____				OBL species _____ x 1 = _____
3. _____				FACW species <u>6</u> x 2 = <u>12</u>
4. _____				FAC species <u>3</u> x 3 = <u>9</u>
5. _____				FACU species <u>53</u> x 4 = <u>212</u>
= Total Cover				UPL species <u>30</u> x 5 = <u>150</u>
Remarks: <u>NA</u>				Column Totals: <u>92</u> (A) <u>383</u> (B)
				Prevalence Index = B/A = <u>4.16</u>
Herb Stratum (Plot size: <u>2x2</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>LOL per (P)</u>	<u>30%</u>	<u>Y</u>	<u>UPL</u>	<input checked="" type="checkbox"/> Dominance Test is >50%
2. <u>POA am (P-maybe)</u>	<u>50%</u>	<u>Y</u>	<u>FACU</u>	<input checked="" type="checkbox"/> Prevalence Index is ≤3.0 ¹
3. <u>LOT ped</u>	<u>2%</u>		<u>FAC</u>	<input checked="" type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. <u>TRF rep (P)</u>	<u>3%</u>		<u>FACU</u>	<input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
5. <u>RAN Ha</u>	<u>1%</u>		<u>FACW</u>	
6. <u>RAN rep</u>	<u>1%</u>		<u>FAC</u>	
7. <u>JUN eff</u>	<u>8%</u>		<u>FACW</u>	
8. <u>Bare soil - incidental</u>	<u>8%</u>		<u>/</u>	
= Total Cover				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Remarks:				Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>

Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shend Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: Plot 4A
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): Drain Local relief (concave, convex, none): Slope (%): 0
 Latitude: _____ Longitude: GPS #: 370 Datum: WGS 84
 Soil Map Unit Name: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

Ret
Plot 1
Sheet

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	
Remarks: <u>Plot problematic for hydric ID</u>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u>	(A)
2. _____				Total Number of Dominant Species Across All Strata: <u>2</u>	(B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u>	(A/B)
4. _____				Prevalence Index worksheet:	
= Total Cover				Total % Cover of: _____ Multiply by: _____	
Sapling/Shrub Stratum (Plot size: _____)				OBL species _____ x 1 = _____	
1. _____				FACW species _____ x 2 = _____	
2. _____				FAC species _____ x 3 = _____	
3. _____				FACU species _____ x 4 = _____	
4. _____				UPL species _____ x 5 = _____	
5. _____				Column Totals: _____	(A) _____ (B) _____
= Total Cover				Prevalence Index = B/A = _____	
Herb Stratum (Plot size: <u>2x2</u>)				Hydrophytic Vegetation Indicators:	
1. <u>MYR Aqu</u>	<u>30</u>	<u>Y</u>	<u>OBL</u>	<input checked="" type="checkbox"/> Dominance Test is >50%	
2. <u>PER hyd</u>	<u>10</u>		<u>FACW</u>	<input checked="" type="checkbox"/> Prevalence Index is ≤3.0 ¹	
3. <u>LUD pal</u>	<u>5</u>		<u>OBL</u>	Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
4. <u>AZO fl</u>	<u>55</u>	<u>Y</u>	<u>OBL</u>	Problematic Hydrophytic Vegetation ¹ (Explain)	
5. _____				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
6. _____				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	
7. _____					
8. _____					
9. _____					
10. _____					
11. _____					
12. _____					
= Total Cover					
Remarks: <u>Aquatic veg in drain primarily.</u>					

Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: shand Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: Plot 5
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): hill slope Local relief (concave, convex, none): none Slope (%): 10
 Latitude: _____ Longitude: GPS# : Plot 5 Datum: WGS 84

Ref Plot 1

Soil Map Unit Name: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: <u>Peat soil problematic in determining hydric.</u>			

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC:	<u>0</u> (A)
2. _____				Total Number of Dominant Species Across All Strata:	<u>1</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>0</u> (A/B)
4. _____				= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)					
1. _____				Prevalence Index worksheet:	
2. _____				Total % Cover of:	Multiply by:
3. _____				OBL species	x 1 = _____
4. _____				FACW species	<u>5</u> x 2 = <u>10</u>
5. _____				FAC species	<u>30</u> x 3 = <u>90</u>
				FACU species	<u>65</u> x 4 = <u>260</u>
				UPL species	x 5 = _____
				Column Totals:	<u>100</u> (A) <u>360</u> (B)
				Prevalence Index = B/A = <u>3.60</u>	
Herb Stratum (Plot size: <u>2x2</u>)					
1. <u>HOL lan</u>	<u>15%</u>		<u>FAC</u>	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input checked="" type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input checked="" type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
2. <u>POA am</u>	<u>65%</u>	<u>Y</u>	<u>FACU</u>		
3. <u>RAN isp</u>	<u>15%</u>		<u>FAC</u>		
4. <u>JUN eff</u>	<u>5%</u>		<u>FACW</u>		
5. _____				Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
11. _____					
12. _____				= Total Cover	
Remarks: <u>(P) - Pasture sp.</u>					

Adapted from US Army Corps of Engineers

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Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: _____ Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: Plot 6
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): Drain Local relief (concave, convex, none): Drain Slope (%): ✓
 Latitude: _____ Longitude: GPS #: WP 371 Datum: WGS 84
 Soil Map Unit Name: _____

Ref Plot 1

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	
Remarks: <i>Peat soils problematic for determining hydric</i>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)
2. _____				Total Number of Dominant Species Across All Strata: <u>4</u> (B)
3. <u>NA</u>				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. _____				
= Total Cover				
Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. _____				Total % Cover of: _____ Multiply by: _____
2. _____				OBL species _____ x 1 = _____
3. _____				FACW species _____ x 2 = _____
4. _____				FAC species _____ x 3 = _____
5. _____				FACU species _____ x 4 = _____
= Total Cover				UPL species _____ x 5 = _____
				Column Totals: _____ (A) _____ (B)
				Prevalence Index = B/A = _____
Herb Stratum (Plot size: <u>2x2</u>) (P)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>HOL lan</u>	<u>20%</u>	<u>Y</u>	<u>FAC</u>	<input checked="" type="checkbox"/> Dominance Test is >50%
2. <u>JUN eff</u>	<u>10%</u>	<u>Y</u>	<u>FACW</u>	<input checked="" type="checkbox"/> Prevalence Index is ≤3.0 ¹
3. <u>JUN pla</u>	<u>10%</u>	<u>Y</u>	<u>FACW</u>	<input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. <u>LOT ped</u>	<u>5%</u>	<u>Y</u>	<u>FAC</u>	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
5. <u>other mixed</u>	<u>5%</u>	<u>✓</u>	<u>NA</u>	
6. <u>Open ground</u>	<u>50</u>	<u>✓</u>	<u>NA</u>	
= Total Cover				
				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
Remarks: <i>Mixed 5% COR sel, PSE lt, RAW flg</i>				

Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shand Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: Plot 7
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): wetland flat Local relief (concave, convex, none): N/A Slope (%): 0
 Latitude: _____ Longitude: GPS #: Plot 7 Datum: WGS 84
 Soil Map Unit Name: _____

Ref Plot 1 Sheet.

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	
Remarks: <u>Reat soil - problematic for hydric ID.</u>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)	
2. _____				Total Number of Dominant Species Across All Strata: <u>4</u> (B)	
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)	
4. _____				Prevalence Index worksheet:	
= Total Cover				Total % Cover of: _____	Multiply by: _____
Sapling/Shrub Stratum (Plot size: <u>10m Rad.</u>)				OBL species _____ x 1 = _____	
1. <u>SAL cin</u>	<u>40</u>	<u>Y</u>	<u>FACW</u>	FACW species _____ x 2 = _____	
2. <u>COP tree</u>	<u>1</u>	<u>Y</u>	<u>FACW</u>	FAC species _____ x 3 = _____	
3. _____				FACU species _____ x 4 = _____	
4. _____				UPL species _____ x 5 = _____	
5. _____				Column Totals: _____ (A) _____ (B)	
= Total Cover				Prevalence Index = B/A = _____	
Herb Stratum (Plot size: <u>2x2</u>)				Hydrophytic Vegetation Indicators:	
1. <u>GLY MAX</u>	<u>60%</u>	<u>Y</u>	<u>OBL</u>	<input checked="" type="checkbox"/> Dominance Test is >50%	
2. <u>LOT ped</u>	<u>40%</u>	<u>Y</u>	<u>FAC</u>	<input checked="" type="checkbox"/> Prevalence Index is ≤3.0 ¹	
3. _____				<input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
4. _____				<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)	
5. _____				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
6. _____				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	
7. _____					
8. _____					
9. _____					
10. _____					
11. _____					
12. _____					
= Total Cover					
Remarks: <u>Most willow borderline sapling/shrub - Combined plots</u>					

Adapted from US Army Corps of Engineers

New Zealand – Version 1.0

Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shand Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: Plot 8
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): wetland flat Local relief (concave, convex, none): none Slope (%): 0
 Latitude: _____ Longitude: GPS #: Plot 8 Datum: WGS 84
 Soil Map Unit Name: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

Ref Plot Sheet

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Hydic Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: <u>Peat problematic for hydric ID.</u>			

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)
2. _____				Total Number of Dominant Species Across All Strata: <u>3</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. _____				
= Total Cover				
Sapling/Shrub Stratum (Plot size: <u>10m Rad</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. <u>SAL cm</u>	<u>2</u>	<u>Y</u>	<u>FACW</u>	Total % Cover of: _____ Multiply by: _____
2. _____				OBL species _____ x 1 = _____
3. _____				FACW species _____ x 2 = _____
4. _____				FAC species _____ x 3 = _____
5. _____				FACU species _____ x 4 = _____
= Total Cover				UPL species _____ x 5 = _____
= Total Cover				Column Totals: _____ (A) _____ (B)
= Total Cover				Prevalence Index = B/A = _____
Herb Stratum (Plot size: <u>2x2</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>MAC vrb</u>	<u>40%</u>	<u>Y</u>	<u>OBL</u>	<input checked="" type="checkbox"/> Dominance Test is >50%
2. <u>HOL lan</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>	<input checked="" type="checkbox"/> Prevalence Index is ≤3.0 ¹
3. <u>LOT ped</u>	<u>5</u>		<u>FAC</u>	<input checked="" type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. <u>GLV max</u>	<u>5</u>		<u>OBL</u>	<input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
= Total Cover				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
= Total Cover				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
Remarks: <u>(P) Pasture species.</u> <u>Combined tree & sapling</u>				

Adapted from US Army Corps of Engineers

New Zealand – Version 1.0

Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shand Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: Plot 8A
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): Drain Local relief (concave, convex, none): ✓ Drain Slope (%): NA
 Longitude: GPS # Plot 8 - Drain adjacent. Datum: WGS 84

Ref Plot 1 sheet.

Soil Map Unit Name: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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 Soil Present? Yes _____ No _____	
Wetland Hydrology Present? Yes _____ No _____	
Remarks: <u>Reat problematic for hydric ID.</u>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)
2. _____				Total Number of Dominant Species Across All Strata: <u>2</u> (B)
3. <u>NA</u>				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. _____				
_____ = Total Cover				
Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. _____				Total % Cover of: _____ Multiply by: _____
2. _____				OBL species _____ x 1 = _____
3. _____				FACW species _____ x 2 = _____
4. _____				FAC species _____ x 3 = _____
5. _____				FACU species _____ x 4 = _____
_____ = Total Cover				UPL species _____ x 5 = _____
				Column Totals: _____ (A) _____ (B)
				Prevalence Index = B/A = _____
Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>JUN art</u>	<u>20</u>	<u>Y</u>	<u>FACW</u>	<input checked="" type="checkbox"/> Dominance Test is >50%
2. <u>JUN pla</u>	<u>10</u>	<u>Y</u>	<u>FACW</u>	<input type="checkbox"/> Prevalence Index is ≤3.0 ¹
3. <u>Alga</u>	<u>70%</u>		<u>N/A</u>	<input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. _____				<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
5. _____				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
<u>100</u> = Total Cover				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
Remarks:				

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Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shand Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: Plot 9
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): NA Slope (%): 15
 Latitude: _____ Longitude: GPS #: Plot 9 Datum: WGS 84 } Ref Plot 1

Soil Map Unit Name: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	
Remarks: <u>Reat problematic for hydric ID.</u>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)
2. _____				Total Number of Dominant Species Across All Strata: <u>3</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>66</u> (A/B)
4. _____				
= Total Cover				
Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. _____				Total % Cover of: _____ Multiply by: _____
2. _____				OBL species _____ x 1 = _____
3. _____				FACW species _____ x 2 = _____
4. _____				FAC species <u>67</u> x 3 = <u>201</u>
5. _____				FACU species <u>5</u> x 4 = <u>20</u>
= Total Cover				UPL species <u>25</u> x 5 = <u>125</u>
				Column Totals: <u>97</u> (A) <u>346</u> (B)
				Prevalence Index = B/A = <u>3.57</u>
Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>Lol per</u> (P)	<u>25</u>	<u>Y</u>	<u>UPL</u>	<input checked="" type="checkbox"/> Dominance Test is >50% <u>All FAC</u>
2. <u>HOL 1m</u> (P)	<u>25</u>	<u>Y</u>	<u>FAC</u>	<input checked="" type="checkbox"/> Prevalence Index is ≤3.0 ¹
3. <u>RAN rep</u> (P)	<u>40</u>	<u>Y</u>	<u>FAC</u>	<input checked="" type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. <u>TRF rep</u> (P)	<u>5</u>		<u>FACU</u>	<input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
5. <u>RUM obf</u>	<u>2</u>		<u>FAC</u>	
6. <u>others mixed native</u>	<u>3</u>		<u>NA</u>	
= Total Cover				
<u>(P) Pasture species</u>				Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>
Remarks:				

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Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shand Region: _____ Sampling Date: _____
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: Plot 10
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): Wetland Plot Local relief (concave, convex, none): none Slope (%): 0
 Latitude: _____ Longitude: GPS A: Plot 10 Datum: WGS 84
 Soil Map Unit Name: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

Ret Plot
1 sheet.

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	
Remarks: <u>Peat problematic for hydric ID - this location 100% organic.</u>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>NA</u>				Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)
2. _____				Total Number of Dominant Species Across All Strata: <u>2</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. _____				
= Total Cover				
Sapling/Shrub Stratum (Plot size: <u>5m Rad</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. <u>SAL cin</u>	<u>1</u>	<u>Y</u>	<u>FACW</u>	Total % Cover of: _____ Multiply by: _____
2. _____				OBL species _____ x 1 = _____
3. _____				FACW species _____ x 2 = _____
4. _____				FAC species _____ x 3 = _____
5. _____				FACU species _____ x 4 = _____
= Total Cover				UPL species _____ x 5 = _____
				Column Totals: _____ (A) _____ (B)
				Prevalence Index = B/A = _____
Herb Stratum (Plot size: <u>2x2</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>GLY max</u>	<u>85</u>	<u>Y</u>	<u>OBL</u>	<input checked="" type="checkbox"/> Dominance Test is >50%
2. <u>RAN rep</u>	<u>5</u>		<u>FAC</u>	<input type="checkbox"/> Prevalence Index is ≤3.0 ¹
3. <u>GAL pal</u>	<u>1</u>		<u>OBL</u>	<input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. <u>Dead Gly max, veg matter</u>			<u>NA</u>	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
5. <u>~ other incidental</u>				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
= Total Cover				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
Remarks:				

Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shand Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: Plot 11
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): wetland terrace Local relief (concave, convex, none): none Slope (%): 0
 Latitude: _____ Longitude: GPS #: Datum: WGS 84

Ref Plot 11 for Info.

Soil Map Unit Name: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation , Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland?	Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present?	Yes <input checked="" type="checkbox"/> No _____		
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No _____		
Remarks: <u>Peat problematic for hydric ID</u>			

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. _____				
2. _____				
3. _____				
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
_____ = Total Cover				
_____ = Total Cover				
_____ = Total Cover				
_____ = Total Cover				
Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input checked="" type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input checked="" type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)				
Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____				
Remarks:				

Adapted from US Army Corps of Engineers

New Zealand – Version 1.0

Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shand Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: Plot 12
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): hill slope Local relief (concave, convex, none): none Slope (%): 10
 Latitude: _____ Longitude: _____ Datum: WGS 84

Ref Plot 1 sheet

Soil Map Unit Name: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes _____ No <input checked="" type="checkbox"/>		
Wetland Hydrology Present?	Yes _____ No <input checked="" type="checkbox"/>		
Remarks: <u>Peat problematic for hydric ID</u>			

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)
1. _____				
2. _____				
3. _____				
_____ = Total Cover				
Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species <u>5</u> x 1 = <u>5</u> FACW species _____ x 2 = _____ FAC species <u>35</u> x 3 = <u>105</u> FACU species <u>7</u> x 4 = <u>28</u> UPL species <u>40</u> x 5 = <u>200</u> Column Totals: <u>97</u> (A) <u>378</u> (B) Prevalence Index = B/A = <u>3.90</u>
1. _____				
2. _____				
3. _____				
4. _____				
_____ = Total Cover				
Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input checked="" type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input checked="" type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>
1. <u>LOL per (P)</u>	<u>40%</u>	<u>Y</u>	<u>UPL</u>	
2. <u>GLY max</u>	<u>5%</u>		<u>OBL</u>	
3. <u>RAN rep</u>	<u>35%</u>	<u>Y</u>	<u>FAC</u>	
4. <u>TRI rep (P)</u>	<u>15%</u>		<u>FACU</u>	
5. <u>POA ann (P maybe)</u>	<u>2%</u>		<u>FACU</u>	
6. <u>Other - mixed pasture</u>	<u>3%</u>		<u>NA</u>	
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
_____ = Total Cover				
Remarks: <u>(P) Pasture species</u>				

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Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shand. Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: plot 13
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): none Slope (%): 10
 Latitude: _____ Longitude: GPS #: 8 Plot 8 -> uph! Datum: WGS 84

Soil Map Unit Name: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are 'Normal Circumstances' present? Yes No _____
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	
Remarks: <u>Peat problematic for hydric ID.</u>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)
2. _____				Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. <u>NA</u>				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
4. _____				
_____ = Total Cover				
Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. _____				Total % Cover of: _____ Multiply by: _____
2. _____				OBL species _____ x 1 = _____
3. <u>NA</u>				FACW species _____ x 2 = _____
4. _____				FAC species _____ x 3 = _____
5. _____				FACU species _____ x 4 = _____
_____ = Total Cover				UPL species <u>95</u> x 5 = <u>475</u>
				Column Totals: <u>95</u> (A) <u>475</u> (B)
				Prevalence Index = B/A = <u>5</u>
Herb Stratum (Plot size: <u>2x2</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>LOL per</u> (D)	<u>29.5%</u>	<u>4</u>	<u>UPL</u>	<input checked="" type="checkbox"/> Dominance Test is >50%
2. <u>Other-RAN rep + Rumobt</u>	<u>25%</u>		<u>N</u>	<input checked="" type="checkbox"/> Prevalence Index is ≤3.0 ¹
3. _____				<input checked="" type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. _____				<input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
<u>100</u> = Total Cover				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Remarks: <u>(D) Pasture species</u>				Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>

Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shed Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: Plot 14
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0
 Latitude: _____ Longitude: GPS # : Plot 14 Datum: WGS 84
 Soil Map Unit Name: _____

Ref Plot 1 Sheet.

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: <u>Peat problematic for hydric ID</u>			

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)
1. _____				
2. _____				
3. _____				
4. _____				
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species <u>50</u> x 2 = <u>100</u> FAC species <u>5</u> x 3 = <u>15</u> FACU species <u>40</u> x 4 = <u>160</u> UPL species _____ x 5 = _____ Column Totals: <u>95</u> (A) <u>275</u> (B) Prevalence Index = B/A = <u>2.90</u>
Sapling/Shrub Stratum (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
Herb Stratum (Plot size: _____)				
1. <u>JUN etc</u>	<u>50%</u>	<u>Y</u>	<u>FACW</u>	
2. <u>RAN rep</u>	<u>5%</u>		<u>FAC</u>	
3. <u>POA grass (P-mayko)</u>	<u>40%</u>	<u>Y</u>	<u>FACU</u>	
4. <u>other mixed pasture Rum obt Ranflr</u>	<u>5%</u>		<u>NA</u>	
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
_____ = Total Cover				
(P) - Pasture species Remarks: _____				Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input checked="" type="checkbox"/> Prevalence Index is $\leq 3.0^1$ <input checked="" type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____

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New Zealand – Version 1.0

Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shand Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: Plot 14A
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): Drain Local relief (concave, convex, none): W Plain Slope (%): NA
 Latitude: _____ Longitude: GPS #: WP 377 Datum: WGS 84

Ret Plot 1 for info

Soil Map Unit Name: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	
Remarks: <u>Peat problematic for hydric ID - not an issue in drain.</u>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>NA</u>				Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)
2. _____				Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. _____				
= Total Cover				
Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. <u>NA</u>				Total % Cover of: _____ Multiply by _____
2. _____				OBL species _____ x 1 = _____
3. _____				FACW species _____ x 2 = _____
4. _____				FAC species _____ x 3 = _____
5. _____				FACU species _____ x 4 = _____
= Total Cover				UPL species _____ x 5 = _____
				Column Totals: _____ (A) _____ (B)
				Prevalence Index = B/A = _____
Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>PER hyd</u>	<u>80%</u>	<input checked="" type="checkbox"/>	<u>FACW</u>	<input checked="" type="checkbox"/> Dominance Test is >50%
2. <u>MYR grass</u>	<u>5</u>		<u>OBL</u>	<input type="checkbox"/> Prevalence Index is ≤3.0 ¹
3. <u>RAN 1/4m</u>	<u>5</u>		<u>FACW</u>	<input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. <u>CEM min</u>	<u>5</u>		<u>OBL</u>	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
5. <u>Open water</u>	<u>5</u>		<u>NA</u>	
= Total Cover				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
Remarks: <u>Incidental on drain edge : JUN art dominant drain side veg</u>				

Adapted from US Army Corps of Engineers

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Appendix 1 – NZ Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – NEW ZEALAND

Project/Site: Shand Region: _____ Sampling Date: 6/10/20
 Applicant/Owner: _____ Altitude: _____ Sampling Point No: Plot 15
 Investigator(s): _____ Nearby town/city: _____
 Landform (hillslope, terrace, etc.): Slight hill/slope Local relief (concave, convex, none): convex Slope (%): 5
 Latitude: _____ Longitude: GPS #: Plot 15 Datum: WGS 84

Ref Plot 1 for details

Soil Map Unit Name: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes _____ No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Hydic Soil Present? <u>Disturbed</u> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> ?	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Remarks: <u>Peat problematic to ID hydic - Disturbed soil unable to classify Area of earthworks which have created a ponding area that is not natural.</u>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>2</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. _____	_____	_____	_____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
= Total Cover				
Sampling/Shrub Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
= Total Cover				
Herb Stratum (Plot size: <u>2x2</u>)				
1. <u>CAL sta</u>	<u>45</u>	<u>Y</u>	<u>OBL</u>	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
2. <u>Open ground</u>	<u>45</u>		<u>NA</u>	
3. <u>JUN act</u>	<u>5</u>	<u>Y</u>	<u>FACW</u>	
4. <u>PER hyd</u>	<u>5</u>		<u>FACW</u>	
5. <u>RAN fl</u>			<u>FACW</u>	
6. <u>LUD pla</u>			<u>OBL</u>	
7. <u>SAG pro</u>			<u>FACU</u>	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
= Total Cover				
Remarks: <u>Problematic determination due to artificial pooling caused by recent earthworks.</u>				

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Appendix 8: Shand Properties Limited Plant species list

Scientific Name	NVS Code used on field sheets	Common Name	Structural Class	Threat Status (de Lange et al., 2018)	Considered exotic pasture species?
<i>Azolla rubra</i>	AZOrub	Pacific azolla	Ferns	Not threatened	No
<i>Calystegia silvatica subsp. disjuncta</i> ¹	CALsil	Great bindweed	Dicotyledonous Lianes and Related Trailing Plants	Exotic	No
<i>Carex lessoniana</i> ²	CARles	Rautahi	Sedges	Not threatened	No
<i>Carex maorica</i>	CARmao	Maori sedge	Sedges	Not threatened	No
<i>Carex secta</i>	CARsec	Purei	Sedges	Not threatened	No
<i>Carex virgata</i>	CARvir	Swamp sedge	Sedges	Not threatened	No
<i>Carx geminata</i>	CARGem	Cutty grass	Sedges	Not threatened	No
<i>Coprosma tenuicaulis</i>	COPTec	Swamp Coprosma	Dicotyledonous Trees & Shrubs	Not threatened	No
<i>Cortaderia selloana</i>	CORsel	Pampas grass	Grasses	Exotic	No
<i>Galium palustre subsp. palustre</i>	GALpal	Marsh bedstraw	Dicotyledonous Herbs other than Composites	Exotic	No
<i>Glyceria maxima</i>	GLYmax	Glyceria	Grasses	Exotic	No
<i>Holcus lanatus</i>	HOLLan	Yorkshire fog	Grasses	Exotic	Yes
<i>Juncus articulatus</i>	JUNart	Jointed rush	Rushes and Allied Plants	Exotic	No
<i>Juncus effusus var. effusus</i>	JUNeff	Soft rush	Rushes and Allied Plants	Exotic	No
<i>Juncus planifolius</i>	JUNpla	Grass-leaved rush	Rushes and Allied Plants	Not threatened	No
<i>Lemna disperma</i>	LEMdis	Common duckweed	Monocotyledonous Herbs	Not threatened	No
<i>Lolium perenne</i>	LOLper	Perennial rye grass	Grasses	Exotic	Yes
<i>Lotus pedunculatus</i>	LOTped	Lotus	Dicotyledonous Herbs other than Composites	Exotic	No
<i>Ludwigia palustris</i>	LUDpal	Water purslane, marsh ludwigia	Dicotyledonous Herbs other than Composites	Exotic	No

¹ No flowering material - presumed exotic species. Could also be *Calystegia sepium subsp. roseata* or very likely a hybrid of the two.

² *C. lessoniana* and *C. geminata* - both species or a single species possibly present no flowering heads found to confirm ID.

Scientific Name	NVS Code used on field sheets	Common Name	Structural Class	Threat Status (de Lange et al., 2018)	Considered exotic pasture species?
<i>Machaerina articulata</i>	MACart	Jointed Baumea	Sedges	Not threatened	No
<i>Machaerina rubiginosa</i>	MACrub	Baumea	Sedges	Not threatened	No
<i>Myriophyllum aquaticum</i>	MYRaqu	Parrot's feather	Dicotyledonous Herbs other than Composites	Exotic	No
<i>Osmunda regalis</i>	OSMreg	Royal fern	Ferns	Exotic	No
<i>Parablechnum minus</i>	BLEmin	Swamp kiokio	Ferns	Not threatened	No
<i>Parablechnum novae-zelandiae</i>	BLEnov	Kiokio	Ferns	Not threatened	No
<i>Paspalum distichum</i>	PASdis	Mercer grass	Grasses	Exotic	Yes
<i>Persicaria hydropiper</i>	PERhyd	Water pepper	Dicotyledonous Herbs other than Composites	Exotic	No
<i>Pilosella sp.</i>	Pilosella	Hawkweeds	Dicotyledonous Herbs - Composites	Exotic	No
<i>Poa annua</i>	POAann	Annual poa	Grasses	Exotic	Maybe - more appropriately a pasture weed.
<i>Pseudognaphalium luteoalbum</i>	PSElut	Jersey cudweed	Dicotyledonous Herbs - Composites	Not threatened	No
<i>Ranunculus flammula</i>	RANfla	Spearwort	Dicotyledonous Herbs other than Composites	Exotic	No
<i>Ranunculus repens</i>	RANrep	Buttercup	Dicotyledonous Herbs other than Composites	Exotic	No
<i>Ranunculus sceleratus</i>	RANsce	Clerey-leaved buttercup	Dicotyledonous Herbs other than Composites	Exotic	No
<i>Rubus fruticosus agg.</i>	RUBfru	Blackberry	Dicotyledonous Trees & Shrubs	Exotic	No
<i>Rumex obtusifolius</i>	RUMobt	Broad-leaved dock	Dicotyledonous Herbs other than Composites	Exotic	No
<i>Sagina procumbens</i>	SAGpro	Procumbent pearlwort	Dicotyledonous Herbs other than Composites	Exotic	No
<i>Salix cinera</i>	SALcin	Grey willow	Dicotyledonous Trees & Shrubs	Exotic	No
<i>Trifolium repens</i>	TRIrep	White clover	Dicotyledonous Herbs other than Composites	Exotic	Yes

About Boffa Miskell

Boffa Miskell is a leading New Zealand professional services consultancy with offices in Auckland, Hamilton, Tauranga, Wellington, Christchurch, Dunedin and Queenstown. We work with a wide range of local and international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, cultural heritage, graphics and mapping. Over the past four decades we have built a reputation for professionalism, innovation and excellence. During this time we have been associated with a significant number of projects that have shaped New Zealand's environment.

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