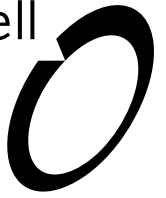


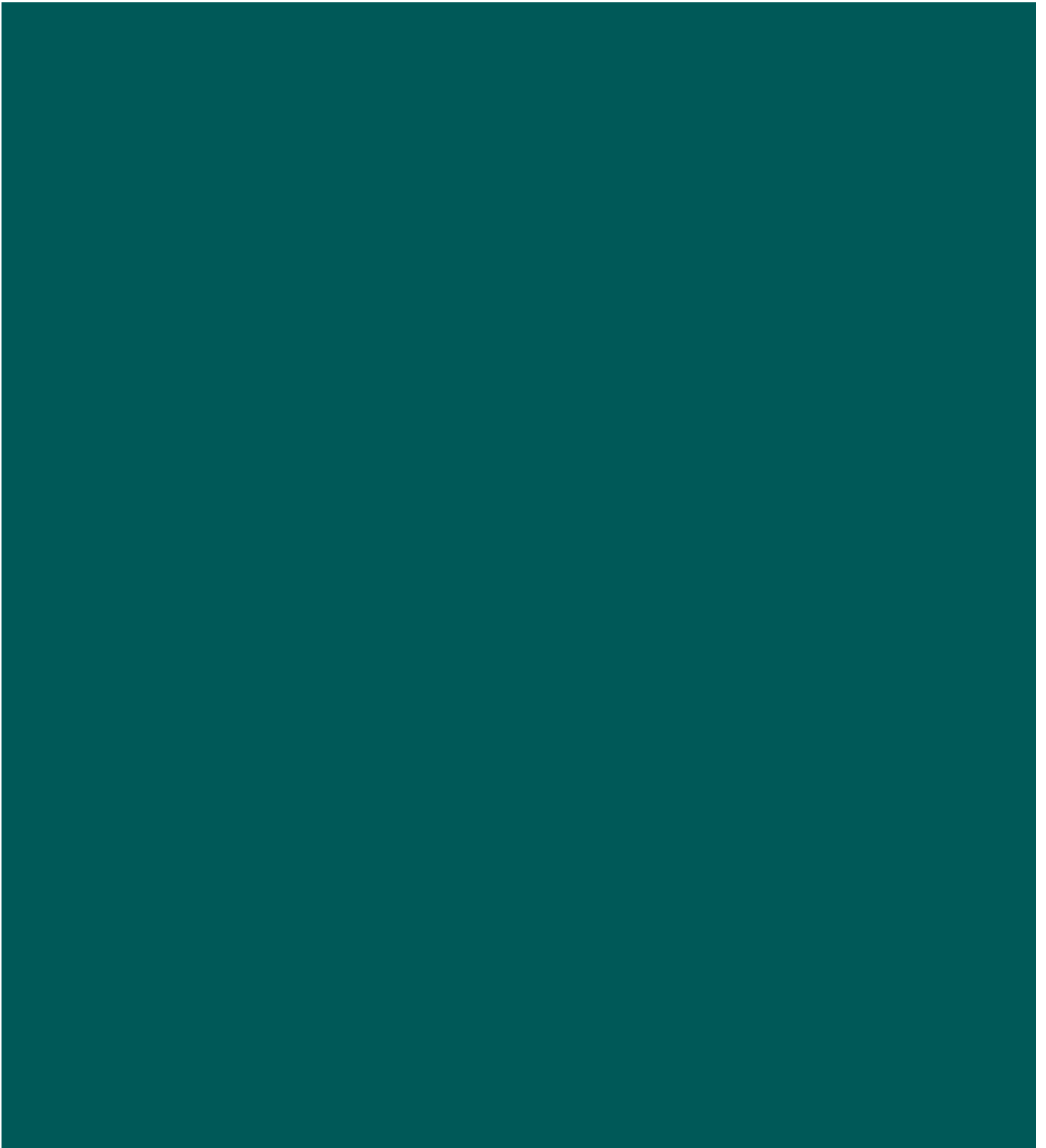
Boffa Miskell



362 Jones Road

Ecological Report
Prepared for Scarbro Civil Limited

14 November 2024









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Appendix 3: Vegetation Plot Data

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1.0 Introduction

A managed fill operation is proposed for a site at 362 Jones Road, Hunua. The project will include two managed fill areas of 9 ha and 2 ha, respectively, and construction of a haul road from Hunua Road. Fill will be placed over a duration of 5 to 10 years, depending on demand (FTL, 2024). The site has a total area of c. 25 ha and is currently under drystock farming.

The project aims to avoid reclamation of streams and wetlands and thereby minimise ecological impacts.

This report presents the results of investigations to identify and evaluate ecological features within the site and assess the ecological effects of the proposal. The report includes:

- Freshwater features, extent and value (river/streams/wetlands).
- Ecological effects (land and water).

2.0 Methods

2.1 Stream Classification

Watercourses were classified using the definitions and criteria in the Auckland Unitary Plan (AUP) (Appendix 1). There were no artificial watercourses.

Streams and overland flowpaths were identified on Auckland Council Geomaps. Site investigations were undertaken on 14 March 2024.

Metservice records for Manukau show 1.8 mm of rainfall during the week preceding the field survey, and a total of 34.8 mm over the previous two weeks. January and February were both wet, with February having 233 mm of rainfall vs a historical average of 57.1 mm.

2.2 Stream Ecological Valuation

To evaluate stream functions a Stream Ecological Valuation (SEV) assessment was undertaken at Site 1. The stream here comprised a section of open channel within a wetland.

The SEV records instream and riparian features and uses a calculator to assign functional scores in four categories (Hydrological, Biogeochemical, Habitat Provision and Biodiversity) and an overall score for functional integrity compared to a forest stream reference site (Storey *et al*, 2009).

2.3 Wetland Classification and Delineation

The Resource Management Act defines a wetland as:

“Permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions.”

The NPS-FM defines a Natural Inland Wetland as a wetland (as defined in the Act) that is not:

- (a) *in the coastal marine area; or*
- (b) *a deliberately constructed wetland, other than a wetland constructed to offset impacts on, or to restore, an existing or former natural inland wetland; or*
- (c) *a wetland that has developed in or around a deliberately constructed water body, since the construction of the water body; or*
- (d) *a geothermal wetland; or*
- (e) *a wetland that:*
 - (i) *is within an area of pasture used for grazing; and*
 - (ii) *has vegetation cover comprising more than 50% exotic pasture species (as identified in the National List of Exotic Pasture Species using the Pasture Exclusion Assessment Methodology (see clause 1.8)); unless*
 - (iii) *the wetland is a location of a habitat of a threatened species identified under clause 3.8 of this National Policy Statement, in which case the exclusion in (e) does not apply.*

Exclusions (a) to (d) do not apply to this site. The wetlands are within pasture used for grazing under e (i). Our survey included assessment of the percent cover of pasture species, and the presence of threatened species, specifically addressing e (ii) and (iii).

The Wetland Delineation Protocols (MfE, 2022) and associated guidance documents provide procedures for assessing whether a potential wetland feature meets the definition of Wetland under the RMA or Natural Inland Wetland. The initial steps in the delineation rely on vegetation communities as indicators of wetland conditions, while additional observations of hydrology and soil characteristics are used where wetland species are not conspicuously dominant in community assemblages (Table 1).

Table 1. Wetland delineation criteria. *A Pass result indicates the feature is a wetland under the RMA (i.e. has vegetation communities adapted to wet conditions). Wetland species are classified as OBL (Obligate wetland), FAC (Facultative), FACW (Facultative Wetland). All Wetlands are Natural Inland Wetlands unless excluded under criteria in the NPS-FM. The pasture exclusion test is applicable to this site as it is used for grazing.*

Wetland as defined in the RMA	
Rapid test	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 1).
Dominance test	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule. If species area all or mostly FAC hydrology indicators must also be present.
Prevalence Index	Wetland if $PI \leq 3.0$, but values around 3.0 should be used alongside other wetland indicators.
Pasture exclusion test for Natural Inland Wetland	
Pasture cover	Not a Natural Inland Wetland if >50% pasture species.

Potential wetland areas were identified using the Geomaps hydrology layer, contours and aerial photography. Where distinct vegetation patterns were clearly visible in aerial imagery, vegetation plots were sampled within representative locations (inside and outside potential wetland areas) to record vegetation composition. Plots were also sampled at the boundaries between vegetation communities to identify the transition point between the wetland and dry land. Hydrological indicators such as saturated soil (boggy ground) and seepages at the toe of the valley hillslope that indicate intersection with the water table were also mapped and used to delineate wetland features.

2.4 Wetland Values

The following functions were assessed on a scale of 0-5, where 0 indicates that functions are not present, 1 represents severely degraded function or negligible value and 5 represents high function or value that would be similar to a reference site in the ecological district (Table 2). These functions were selected following a review of attributes in the EIANZ guidelines (Roper-Lindsay *et al*, 2018). A guide for interpretation of scores is presented in Table 3.

Table 2. Assessment criteria for wetland ecological functions.

Ecological Integrity	1 = highly modified feature with limited internal structure (e.g. ecotones) and external influences dominant. 5=Ecosystem with internal structure and limited external influences.
Ecosystem rarity	1=features performing similar functions are common in the landscape; 5= features are rare in the landscape
Biodiversity	1= supports limited range of indigenous flora and fauna compared to reference site. 5=biodiversity similar to reference site.
Threatened species	1=not utilised by threatened species; 5=important habitat that contributed to sustaining populations of At-Risk or threatened species.
Water quality buffering	1=minimal positive influence on ground or surface water receiving environments; 5=has major positive influence on water quality. Factors include scale of feature relative to catchment, slope, nutrient load, interception of surface flows, livestock disturbance.
Hydrological integrity	1= water level range and hydrological function is highly modified from reference condition; 5= Water level range and hydrological function is similar to reference condition.

Table 3. Interpretation of wetland function scores.

Average score	Overall functional integrity
1	Very Low
>1 to 2	Low
>2 to 3	Moderate
>3 to 4	High
>4	Very High

2.5 Terrestrial Vegetation

The site contains limited vegetation other than pasture. All stands of trees and shrubs were identified, mapped and described.

2.6 Terrestrial Fauna

Vegetation and habitats within the site were evaluated with respect to their suitability as refugia and habitat for native terrestrial fauna, including incidental searches for fauna signs or sightings. Trees were inspected for possible bat roosts and bird nests, and we recorded all bird species seen and heard.

3.0 Ecological Values

3.1 Stream Classification

The classification of streams is presented in Figure 1.

Stream 1 was assessed as a Permanent Stream. The bed of Stream 1 was permanently below the water table, and although the watercourse had predominantly wetland functions (Wetland B, described below) there was some open channel, possibly excavated, with stream characteristics. This was located upstream of the culvert and was the location for the SEV assessment.

Streams 2 and 3 were assessed as Intermittent Streams. The bed of these streams was intermittently below the water table, with flows in different areas observed to be either very low or absent. Stream 2 was in a relatively steep and narrow gully with a defined channel. Stream 3 was less steep and was mainly dished with poorly defined channel margins. Two ponds were present in the stream, which controlled stream flows in both the ponded areas and downstream reaches.

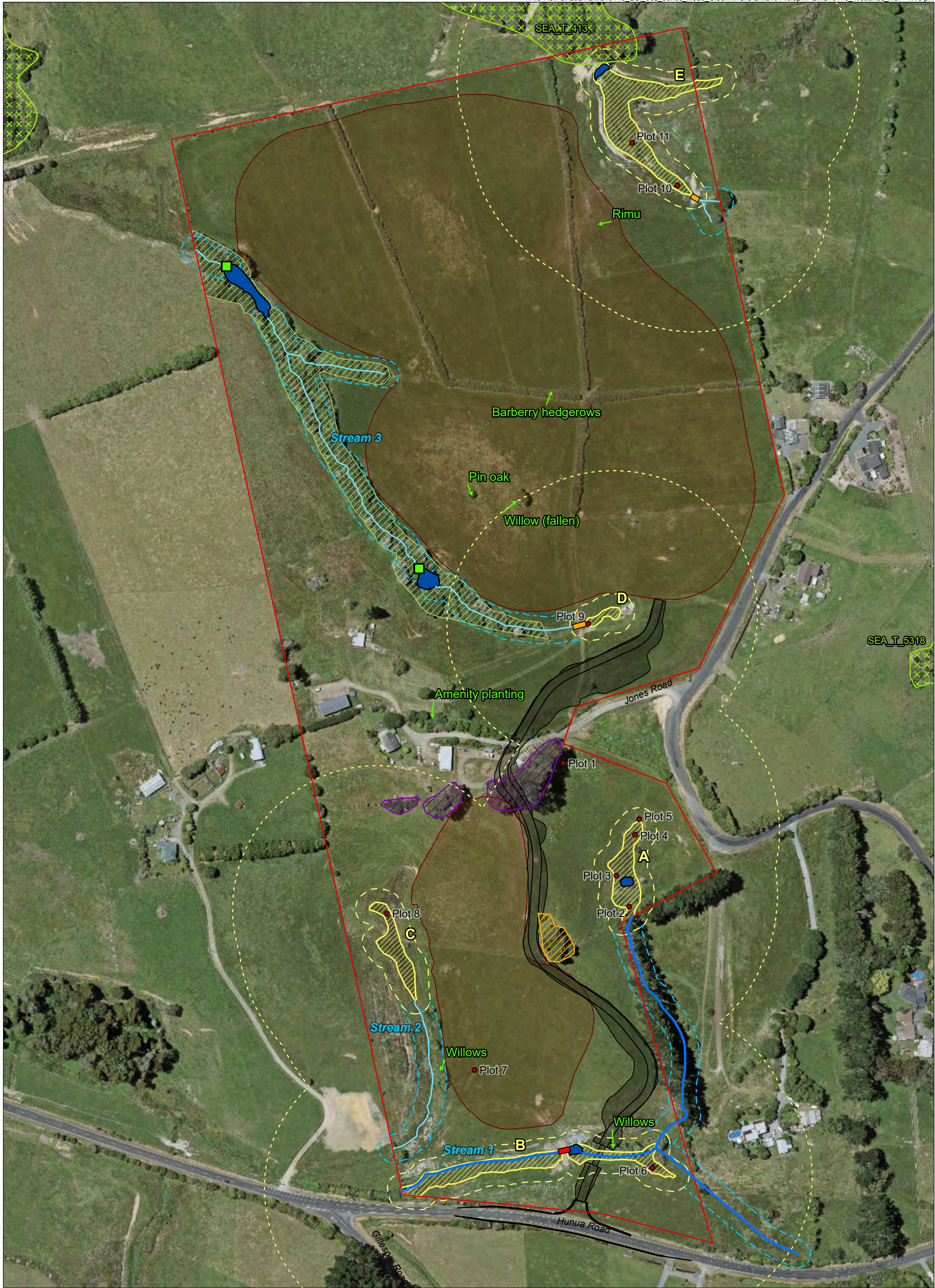
3.2 Stream Ecological Valuation

An SEV assessment was undertaken in the Permanent Stream at Stream 1 in the area of the proposed bridge crossing (Figure 1). No sampling was undertaken within the Intermittent Streams 2 and 3.

Streams 1 and 2 did not have fences designed to exclude livestock and riparian vegetation was limited (some willow trees are present on the north side of Stream 1). Stream 3 was entirely fenced and had riparian vegetation ranging in width from approximately 15 to 30 m (narrower at the upstream end).

The channel at the Stream 1 SEV site was found to have an average width of 1.29 m, depth of 0.22 m, slow velocity, soft substrate with thick sediment deposition, no effective fencing, and riparian vegetation limited to a narrow margin of mainly rushes (*Juncus* spp.) and willow trees on the northern side (Photo 2). The stream had low banks and a narrow effective floodplain.

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The extent of open channel is limited, with wetland characteristics predominant (Wetland B, described below).

The channel here is probably a residual feature in a small gully that has gradually infilled with sediment. It is also possible that it has been excavated or cleared to improve drainage. While

A total of 19 macroinvertebrate taxa were recorded, with only one EPT taxa (a single caddisfly *Triplectides*). The dominant groups were Diptera (62% of sample abundance) and Crustacea (31%). Most fauna were mud-dwelling diptera, ostracods and worms, with some species associated with the marginal plants such as the molluscs and two bug species that prefer open water (waterboatmen and backswimmers). The Macroinvertebrate Community Index score was 63, a low score indicating poor water quality and predominantly tolerant species.

Shortfin eels (*Anguilla australis*) were common. The conservation status of this species is Not Threatened (Dunn *et al*, 2018). No other fish species were recorded.

The overall SEV score was 0.33 out of a maximum possible of 1, a low score reflecting poor habitat functions relative to unmodified reference sites. The value for Hydraulic Functions was 0.48, Biogeochemical Functions 0.27, Habitat provision 0.23 and Biodiversity 0.28 (Table 3). These scores showed low integrity across all categories of functions.

Overall, the stream was found to be highly degraded with very low current values and moderate potential values.

Table 3. SEV function scores at Site 1, 362 Jones Road.

Hydrological	Biogeochemical	Habitat	Biodiversity	Overall score
0.48	0.27	0.23	0.28	0.33

3.3 Wetland Classification and Delineation

Eleven vegetation assessment plots were investigated within and on the periphery of features identified as prospective wetlands in the desktop analysis and site walkover (Table 4; Appendix 2). From this assessment, five wetland features were classified as 'natural inland wetland' and delineated based on NPS-FM protocol. One further feature was assessed but did not qualify as a natural inland wetland (Figure 1).

Table 4. Wetland Plot Results, 362 Jones Road.

Plot	Rapid	Dominance	PI	Pasture %	Dominant Vegetation	Hydric Soils/ Wetland Hydrology	Inland Natural Wetland
Wetland A							
1	Fail	Fail	3.7	65	Rye Grass (E); White Clover (E)	Fail	No
2	Pass	Pass	2.0	20	Jointed Rush (E)	Pass	Yes
3	Pass	Pass	1.5	22	Soft Rush (E)	Pass	Yes
4	Pass	Pass	2.1	22	Jointed Rush (E)	Pass	Yes
5	Fail	Pass	2.9	55	Yorkshire Fog (E)	Pass	No
Wetland B							
6	Pass	Pass	2.0	20	<i>Isolepis Prolifera</i> (N)	Pass	Yes
Wetland C							
7	Fail	Fail	3.2	55	Soft Rush (E); Rye Grass (E)	Pass	No
8	Pass	Pass	1.2	0	Baumea (N)	Pass	Yes
Wetland D							
9	Pass	Pass	2.2	5	Mercer Grass (E)	Pass	Yes
Wetland E							
10	Pass	Pass	2.3	20	Mercer Grass (E)	Pass	Yes
11	Pass	Pass	1.5	0	Mercer Grass (E); Baumea (N); <i>Isolepis Prolifera</i> (N)	Pass	Pass
E = Exotic; N = Native							

3.3.1 Wetland A

Wetland A (963 m²) is a low-lying, concave area located within the headwaters of an intermittent stream draining to the south of the property (Photo 1).



Photo 1: Wetland A Left: view upstream of feature, Right: Surface water and extensive pugging present.

This feature meets the criteria for a *natural inland wetland*, based on the Rapid test. The dominant vegetation cover within this wetland feature was jointed rush (*Juncus articulatus* - exotic), soft rush (*Juncus effusus* - exotic) and baumea (*Machaerina rubiginosa* - native). Surface water was present and flowing at the toe of the hillslope, forming a shallow pond that discharged to the watercourse. The presence of iron floc in the water indicates that the wetland is groundwater-fed. Extensive cattle damage (pugging) was also evident throughout the feature.

3.3.2 Wetland B

Wetland B (1,458 m²) is located within the low-lying riparian zone of Stream 1 (Photo 2).



Photo 2: Wetland B. Top Left: culvert beneath farm access track. Top Right: Ponding upstream of culvert. Bottom Left: Upstream wetland section. Bottom Right: Downstream Wetland section.

The culvert for the farm crossing in the lower stream reaches appears partially buried so that the access track acts as a bund, resulting in ponding and widening of the wetland feature immediately upstream. The stream channel is poorly defined, with low-lying floodplains overgrown with hydrophilic vegetation. Downstream of the farm crossing, flows are restricted, resulting in sedimentation and expansion of wetland vegetation dominated by *Isolepis prolifera* (native) and wiwi (*Juncus edgariae* – native) across the entire channel. Wetland B meets the criteria of *natural inland wetland*, passing the Rapid test. Surface water and extensive pugging was observed throughout the feature.

3.3.3 Wetland C

Wetland C (699 m²) is located within a flat headwater basin which drains into a gully system before discharging into a defined stream channel (Photo 3). Wetland C was assessed as *natural inland wetland* based on the Rapid test as OBL and FACW species (baumea, *Isolepis prolifera* and soft rush) were dominant. Surface water and extensive pugging was observed within the feature.



Photo 3: Wetland C feature within headwater basin of stream

3.3.4 Wetland D

Wetland D is a small feature (158 m²) located within an overland flow path (OLFP) of Stream 3. The feature was dominated by Mercer grass (*Paspalum distichum* – exotic), a FACW grass which, though not recognised as pasture species for the purposes of the NPS-FW, is indicative of the agricultural landuse (Photo 4). The upper extent of the feature appeared to be truncated due to deposition of disturbed soils/ cleanfill in the upper section. The OLFP also appeared to have been deepened and straightened to increase draining efficiency. Wetland D met the criteria of *natural inland wetland* based on the Rapid test.



Photo 4: Wetland D within OLFP dominated by mercer grass.

3.3.5 Wetland E

Wetland E is a large feature (2,171 m²) located in the low-lying basin in the far north-eastern section of the proposed managed fill footprint. The wetland feature is formed by two tributaries with a pond located at the confluence.



Photo 5: Left: Wetland E vegetation and single rimu on upslope; Right: upper gully, partly drained.

The wetland extends up the gully to the south. In this area a drain has been excavated and this has reduced ground saturation and affected the condition of the wetland. Mercer grass and soft rush dominated vegetation on the outer margins of the wetland, while the centre included patches of baumea, *Isolepis prolifera* and water pepper (*Persicaria hydropiper* – Exotic) (Photo 5). Wetland E was assessed as *natural inland wetland*, based on the Rapid test.

3.3.6 Wetland Values

Overall, the project area encompasses 5,450 m² of inland natural wetland; 40% of which is located within Wetland E. All wetland features were found to be heavily modified and actively grazed, and evidently have a long history of agricultural land use. The condition of these features was poor due to significant pugging from stock, drainage, and poor water (algal blooms were noted in areas of standing water).

Wetlands A and D, and the outer extent of wetlands B, C and E were dominated by exotic wetland vegetation including wet tolerant pasture species and rushes. All wetlands within the site are characterised by modified hydrology, low biodiversity and plant communities poorly representative of indigenous wetland ecosystems. The wetlands nevertheless provide hydrological and water quality treatment functions. Such wetlands are common in the agricultural landscape within the Manukau Ecological District.

Table 5. Wetland Values, 362 Jones Road.

Wetland	A	B	C	D	E
Ecological Integrity	3	2	2	1	3
Ecosystem rarity	2	1	1	1	2
Biodiversity	2	1	1	1	2
Threatened species	1	1	1	1	1
Water quality buffering	2	3	2	1	3
Hydrological functions	3	2	2	1	3
Total/30	13	10	9	6	14
Average function score	2.17	1.67	1.50	1.00	2.33
% of potential function	43	33	30	20	47
Overall functional value	Moderate	Low	Low	Very Low	Moderate

3.4 Terrestrial Vegetation

Terrestrial vegetation included riparian forest around Stream 3, and two small stands of trees (both fenced; refer Figure 1). These features are described below. Scattered willows were present along Stream 1 and 2, a number of individual trees and barberry hedgerows were interspersed through the pastureland, as shown in Figure 1.

Riparian Vegetation (Stream 3)

The riparian vegetation surrounding Stream 3 comprises willows (*Salix* spp.) and a variety of native trees and shrubs, including houhere (*Hoheria populnea*), tōtara (*Podocarpus totara*), kōwhai (*Sophora microphylla*), karaka (*Corynocarpus laevigatus*), karamu (*Coprosma robusta*), akeake (*Dodonaea viscosa*), kānuka (*Kunzea robusta*), tarata (*Pittosporum eugenioides*), pōnga (*Cyathea dealbata*), and tī kouka (*Cordyline australis*) (Photo 6 and 7). The groundcover was limited due to grazing, but included pasture grasses, buttercup (*Ranunculus repens*),

Juncus spp., kiokio (*Parablechnum novae-zelandiae*), and blackberry (*Rubus fruticosus*). From Google Earth imagery and Retrolens (<https://retrolens.co.nz/Map>), we determined that this vegetation was planted roughly 20-25 years ago.



Photo 6: Image of the riparian vegetation surrounding Stream 3.



Photo 7: Riparian vegetation surrounding Stream 3.

Macrocarpa stand

Exotic macrocarpa (*Cupressus macrocarpa*) trees and a *Pinus radiata* tree, all around 20-25m tall dominate the stand of trees nearest to the homestead (Photo 8), with a subcanopy of native and exotic shrubs including mapou (*Myrsine australis*) and Chinese privet (*Ligustrum sinense*).

An ~8m tall pūriri (*Vitex lucens*) tree is present on the eastern margin of the stand. The groundcover is largely composed of pasture grass.



Photo 8: *Macrocarpa* and undergrowth in the first southern vegetation patch.

Native Forest Remnant

A small remnant stand of mature and regenerating native trees (5-12m tall) is present on the margin of the proposed managed fill footprint in the southern quarter of the property. Mature specimens of rewarewa (*Knightia excelsa*), tōtara, kauri (*Agathis australis*), pōhutukawa (*Metrosideros excelsa*) form the canopy, with a subcanopy of karaka, tree privet (*Ligustrum lucidum*) and mapou. Juvenile mapou, totara, karaka and Chinese privet form the understory.



Photo 9 and 10: Native forest remnant.

SEA

Part of a Significant Ecological Area is located in the north-east of the site, at the northern end of Wetland E. This comprises approximately 650 m² of terrestrial vegetation and is identified as SEA_T_413. The SEA continues northwards along the stream corridor. The Schedule 3 of the AUP notes this SEA meets sub-factor 3, assessed as having indigenous diversity values. Aerial photography confirms that the SEA vegetation within the site comprises pine trees.

3.5 Fauna

3.5.1 Native Birds

The forest and scrub habitats present are likely to provide permanent and intermittent habitat for roosting and nesting native birds. Bird Atlas records of native species in the surrounding area (Table 6) include a variety of mostly common species that typically occur in similar habitats. During the site visit grey warbler, spurwing plover, New Zealand fantail and tūī were heard, and pūkeko, swamp harrier, sacred kingfisher and silvereye were sighted. An old nest (possibly of a tui) was found in the riparian vegetation. The site visit was carried out at the end of the breeding season so active nesting was not observed.

Table 6. Native and endemic bird species recorded within a 6km radius of 362 Jones Road, Hunua (Data from OSNZ Atlas of Bird Distribution in NZ, 2024).

Species	Scientific Name	NZ status	Conservation status (Robertson et al., 2021)
Shining cuckoo	<i>Chrysococcyx lucidus</i>	Native	Not Threatened
Kākā	<i>Nestor meridionalis</i>	Endemic	At Risk – Recovering
Grey warbler	<i>Gerygone igata</i>	Endemic	Not Threatened
Ruru	<i>Ninox novaeseelandiae</i>	Native	Not Threatened
Tomtit	<i>Petroica macrocephala</i>	Endemic	Not Threatened
NZ fantail	<i>Rhipidura fuliginosa</i>	Endemic	Not Threatened
Silvereye	<i>Zosterops lateralis</i>	Native	Not Threatened
Kererū	<i>Hemiphaga novaeseelandiae</i>	Endemic	Not Threatened
Tūī	<i>Prothemadera novaeseelandiae</i>	Endemic	Not Threatened
Harrier hawk	<i>Circus approximans</i>	Native	Not Threatened
Sacred kingfisher	<i>Todiramphus sanctus</i>	Native	Not Threatened
White-faced heron	<i>Egretta novaehollandiae</i>	Native	Not Threatened
Spurwing Plover	<i>Vanellus miles</i>	Native	Not Threatened
Weka	<i>Gallirallus australis</i>	Endemic	Not Threatened
Welcome Swallow	<i>Hirundo neoxena</i>	Native	Not Threatened
Paradise Shelduck	<i>Tadorna variegata</i>	Endemic	Not Threatened
Pūkeko	<i>Porphyrio melanotus</i>	Native	Not Threatened

3.5.2 Bats

Long tailed bats (*Chalinolobus tuberculatus*) are known to be resident in the Hunua Ranges, with numerous detections within a 10km radius of the Project Site. The record closest to 362

Jones Road 5.6 km away, from 2019 (Bat database, Auckland Council). These bats may forage over extensive ranges, often feeding along forest edges and tree lines, and are known to move their roosts frequently.

Mature trees within the site, including large macrocarpa, pine, and both planted and remnant native trees, offer potential roosting habitat for long-tailed bats. The large macrocarpa trees (Photo 3) were observed to have features suitable roosting features for long-tailed bats, specifically small crevices and large areas of loose bark. The threat classification of the long-tailed bat (*Chalinolobus tuberculatus*) is “Threatened – Nationally Critical” (O’Donnell et al., 2023).

3.5.3 Native Lizards

Prospective native lizard habitat features were inspected during the site visit. Native vegetation patches, particularly the riparian vegetation and forest remnant, appeared moderately suitable for both arboreal and ground dwelling lizards. The presence of flakey bark and some diversity of native tree species would provide moderate habitat for arboreal geckos. In the understory the leaf litter offered moderately suitable habitat for ground dwelling skinks. However, the small extent and lack of continuity between patches of native vegetation may limit the viability of these habitats.

Based on a desktop assessment, it is possible that the following species are present within the property (Table 7):

Table 7. Native lizards recorded within a 10km radius of 362 Jones Road, Hunua, across the last 9 years. Data from Auckland Council, accessed in April 2024, and Department of Conservation Bioweb Database, access in April 2024.

Species	Common Name	Threat Classification (National & Regional) Hitchmough <i>et al</i> , 2021.	Habitat Preference	Observation Year
<i>Oligosoma aeneum</i>	Copper skink	At Risk – Declining Regionally Declining	Open scrubland, forest edges – ground dwelling	2015
<i>Naultinus elegans</i>	Elegant gecko	At Risk – Declining Regionally Declining	Forest / scrub – arboreal	2015

3.5.4 Pest Animals

Several rabbits (*Oryctolagus cuniculus*) were observed in the pasture grasses of the site. Rabbits are considered to be ecological and agricultural pests due to their herbivorous grazing, destroying smaller plant species and regenerating native seedlings.

4.0 Proposed Activities

4.1 Stream Crossing

The haul road will cross Stream 1 and Wetland B via a bridge located immediately upstream of the existing culvert. The purpose of the bridge is to avoid encasement of the stream and any wetland reclamation. The bridge will span the stream from abutments on either side, allowing unimpeded flow, hydrological connectivity to the groundwater, and continuity of instream habitat from upstream to downstream. This design will ensure there is no loss of habitat or impairment of fish passage.

The existing 600 mm diameter culvert will be removed, and the natural wetland and stream will be reinstated here. The purpose of removing this structure is to daylight and restore approximately 60 m² of stream and wetland and wetland habitat, achieving a net gain in ecological values. The total works area including bank trimming is approximately 100 m².

The following methodology has been provided by FTL:

Works are to be undertaken during forecast period of fine weather (minimum 2-3 days) in summer season, ideally when no water is flowing in stream:

- (a) Establish erosion and sediment controls, comprising super silt fence across stream channel downgradient of culvert. Provide for portable pump and sand bags to be available on-site for damming stream on upstream side, in event of unexpected rainfall or stream low flows;*
- (b) Remove any vegetation from culvert crossing;*
- (c) Remove road embankment (soil material) to stockpile. Place suitable materials in Fill facility and dispose of excess or unsuitable spoil off-site to appropriate facility. Contamination testing of fill material in embankment may be required based on visual observations (at discretion of SQEP).*
- (d) Remove existing 600 mm diameter culvert and any hardfill bedding material and associated inlet/outlet structures.*
- (e) Remove residual stream embankment down to existing stream bed level and undercut by 150mm.*
- (f) Trim stream banks to tie in with existing stream profile.*
- (g) Place 150mm clean topsoil on restored stream bed and stream batters and cover with biodegradable coir matting or similar, pinned in place.*
- (h) Grass stream bed and banks, using water tolerant grass (Outfield 'Rye' grass or similar approved). Supplier – Prebble Seeds, 09 273 4682*
- (i) Remove erosion/sediment controls and any temporary dams.*

Notes:

- Works extent is approx. 100m² with estimated embankment volume of 33m³.*
- Estimated works duration is two days, but 3 days allowed to provide some contingency.*
- Stream bed disturbance during construction will be limited to the minimum practical area and not more than 5m either side of the old culvert, excluding the length of the culvert itself.*
- All construction materials and ancillary materials will be removed from the stream bed following completion of construction.*

A plan showing the works is included in Appendix 4.

4.2 Haul Road

Construction of the haul road will require earthworks, including a steep incline. Sediment generation and yield from these works will be managed under an Erosion and Sediment Control Plan complying with Auckland Council guidance GD05 (Auckland Council, 2018). The finished road surface will be stabilised and compacted to a high standard to allow the passage of heavy vehicles.

The stand of macrocarpa and associated trees will be removed to allow an efficient alignment of the haul road.

4.3 Fill Areas

The footprint of the southern fill site is 2 ha, and the northern fill area is 9 ha in extent. These fill areas will have a minimum setback of 10 m from any stream and wetland features. The fill area and setbacks are shown in Figure 1 and Appendix 4.

The fill areas will be managed to control sediment generation. As described in the FTL Engineering Report (FTL, 2024), erosion and sediment control measures will comply with GD05 and are expected to include:

- Staging of fill with maximum of 2ha operational at any time.
- Stabilisation of filled areas (mulching, temporary and permanent seeding).
- Benching.
- Clean and dirty water diversion.
- Silt fences.
- Sediment retention ponds with chemical flocculation, as required based on bench testing.

4.4 Riparian Management

It is proposed to establish a 10 m wide riparian zone on each side of the stream and wetland features in the south area (Wetland A, B and C and Stream 1 and 2).

These zones will be planted and fenced. These measures will protect the features from livestock damage, reduce sediment and nutrient inputs, increase biodiversity, and enhance ecological functioning by creating more complex communities and interactions between land and water ecosystems.

Stream 3 and its associated riparian margin will be retained and is already fenced. The area will be managed with weed and pest control (possum control) and infill planted with native trees and shrubs.

Wetland D will be planted with native wetland species and a swale established up to Jones Road to improve runoff quality. Where practical, surface flows and subsurface drainage will be directed to this wetland to maintain an intermittently wet wetland hydrology. The fill area will be a minimum distance of 10 m from this feature. Erosion control measures will be important here during construction in order to avoid any direct sediment runoff.

Wetland E will be fenced to protect it from future livestock grazing. The aim will be to reduce pressure from landuse activities. The hydrological functions appear to be relatively intact. The aim here is to maintain wetland functions. This will include fencing of the SEA area that adjoins the wetland. Fencing the SEA within the property will prevent livestock damage and allow the regeneration of native plant species, while the fencing of the adjacent wetland will provide a further buffer zone.

The purpose of this proposed riparian zone management is to enhance ecological values through the project and have a positive effect on streams and wetlands. While we have not identified specific effects on streams and wetlands that require offsetting or compensation, it is important that on-site riparian benefits are available for this purpose, if later required.

5.0 Assessment of Effects

5.1 Streamworks

The haul road crossing of Stream 1 has two components, being the construction of the new bridge, and the removal of the old culvert.

The proposed bridge will cross at a narrow point in the channel and will avoid works within the channel or any permanent reclamation of stream or wetland environments. The bridge will ensure continuity of habitats within the channel and unimpeded fish passage. Effects of the bridge on Stream 1 will be low or negligible.

The removal of the culvert will have temporary effects but long-term benefits by restoring (daylighting) an area of watercourse. The methodology described in Section 4.1 has been developed to minimise construction effects by isolating the works area, minimising the extent and duration of works and managing sediment from earthworks. Construction effects on Stream 1 will be localised and short term, with rapid recolonisation expected by wetland vegetation. The daylighting of the existing culvert will restore a section of wetland and result in a net ecological gain.

5.2 Vegetation Removal

Vegetation removal will be limited to removal of macrocarpa trees, hedgerows and specimen trees. The terrestrial SEA that adjoins Wetland E will be avoided. We understand that the removal of the macrocarpas is a permitted activity (Vance Hodgson, *pers comm*), and that they may be removed prior to haul road construction. As the macrocarpa stand is potentially suitable for bat roosting, we recommend an acoustic monitor check prior to felling to ensure that no long-tailed bats are present. While the presence of bats is unlikely, this would be a good management practice to manage risk on a threatened species. We recognise that this recommendation is not enforceable by consent. The proposed vegetation removal would have low ecological effects, provided that no At-Risk or Threatened species are present.

5.3 Sediment Discharge

Runoff of sediment from earthworks areas during fill construction and operation will be managed by erosion and sediment control practices as listed in Section 4.3. Fraser Thomas Partners note that: *"The majority of sediment in runoff from active filling areas is expected to be removed in these sediment retention ponds, with typical removal efficiencies of 95% or higher typically being achieved with flocculation. The treated runoff will be discharged from these ponds in a controlled manner. It will contain some residual solids, the majority of which is likely to be present in dissolved form and hence less likely to precipitate out. Some localised, minor sediment deposition may occur downstream of the pond discharge points"*.

The existing land is grazed and sediment discharges may be quite high at times of the year, depending on factors such as stock numbers, grass growth and rainfall. During the operation of the fill there will be no sediment discharge from agriculture, a reduction which that will have a positive effect on the overall load entering the streams.

Discharges from Sediment Retention Ponds will occur into Stream 1 (SRP 3), and Stream 3 (SRP1) and a constructed pond at the lower end of Wetland E (SRP2) (Appendix 4). The discharge from SRP2 will enter an existing on-line pond at the wetland outlet and will not pass through the wetland here. Discharges from these treatment devices may result in periodic increases in suspended sediment concentrations during and after rainfall, throughout the period of operation of the fill. As noted above, there may also be localised sediment deposition near discharge points. Both suspended sediment and deposits on the stream bed can have adverse effects on aquatic plants and animals. The aquatic habitats here receive runoff from agriculture and are not considered to be sensitive to the proposed discharges. Any ecological effects are likely to be localised and have only minor effects on ecological functions and values. Effects may include reduction in flora and fauna abundance within areas of sediment deposition but are unlikely to have effects on biodiversity or abundance outside these localised areas.

To manage the effects, it is important that erosion and sediment controls minimise the extent of such depositional areas. In our assessment the proposed controls to GD05 guidelines together with limitations of the exposed earthworks are appropriate and likely to ensure that the level of effects on ecological values in the receiving environment are low.

5.4 Hydrological Effects

Potential effects may arise from the effects of changes to surface or groundwater flows on streams and wetlands. Groundwater recharge and surface runoff in the earthworks area is likely to be locally affected by the works. Some surface water will be diverted into treatment systems and discharged further downstream than currently (see SRP locations, Appendix 4). The placed fill will be compacted and is likely to have low permeability and low water holding capacity. The additional loading on the surface may also affect water tables, potentially squeezing or deforming it.

Generally, we note that the total amount of water in the catchment of each wetland and stream will be maintained; the fill will be located at a higher elevation than the streams and wetlands, which reduces the likelihood of interactions with the water table; and potential effects on flows will be mitigated by designing drainage to feed into features, where practicable.

The catchment area open at any time will be limited, with a maximum of 2ha going to either of the northern sediment ponds and a maximum of 1.2ha going to the southern sediment ponds. Hence, clean water from the rest of these catchments will be diverted from entering

these ponds and be directed to the current streams/wetlands. This will further mitigate the effect of the cleanfill on streams/wetlands.

Earthworks in the catchment of Wetland A are limited and hydrological effects appear to be unlikely.

Stream 1 and wetland B are at lower elevations than the fill and have a large upstream catchment source of flow that will not be affected by the proposed activities.

Fill will be placed on the eastern side of Wetland C and Stream 2 (Figure 1), but not to the west or north, and the fill is largely elevated above the water table of these features and unlikely to have any hydrological effects.

Wetland D is a small feature at the head of Stream 3, with very low current and potential ecological values. It is close to the northern fill area, which is >10 m to the northern side of the feature and is not obstructing the most direct surface and groundwater flowpaths to the east. The fill here will load and compress the ground under the fill, and there is also likely to be less infiltration and recharge which may affect groundwater levels. The main upslope flowpath is eastward and is likely to provide surface flows and infiltrated flows. Directing surface water flows into this feature will also help maintain the wetland extent and ecological functions. Planting the feature would further enhance biodiversity values. Overall, with appropriate management measures, effects on this small wetland would be low, or potentially a net gain.

Effects on the water table of Stream 3 are unlikely, however, diversion of dirty water for treatment will reduce surface inflows to the middle and upper stream reaches during and after rainfall events. This stream is intermittent and contains some constructed pond features. The duration of non-flowing periods may potentially increase in parts of the stream, but flows are likely to persist during most winter months. These potential effects should be mitigated by diverting clean water flows into the upper reaches of the stream where practicable. Overall, the effects on ecological values are likely to be low.

Wetland E has is at low risk of adverse effects due to its low elevation relative to the fill, groundwater connection and large catchment area unaffected by fill operations.

5.5 National Environmental Standards for Freshwater

In regard to the National Environmental Standards for Freshwater, earthworks and the associated diversion of water is proposed outside of, but within 100 m of Natural Inland Wetlands. This will not result in the complete or partial drainage of any Natural Inland Wetland. No vegetation clearance or earthworks is proposed within a 10 m setback of a Natural Inland Wetland. The diversion and discharge of water within 100m of Natural Inland Wetlands is proposed but engineering analysis has confirmed that there will be no associated changes to water levels or hydrological function of the wetlands.

6.0 Summary and Conclusion

The ecological features with the project area were described and classified. Two Intermittent Streams and one Permanent Stream were identified, and five natural Inland Wetlands. The streams were assessed as having very low ecological values, and the wetlands very low (Wetland D), low (wetland B and C) and moderate ecological values (Wetland A and E).

The proposed activities include fill placement, and haul road construction including a new bridge. The fill areas have been located to avoid reclamation of stream and wetlands. Protection and planting of riparian zones is also proposed in order to generate a positive ecological outcome for the project. This will provide an additional buffer zone to the SEA that will improve the values of the SEA within the property. We recommend that a planting plan is prepared by a suitably qualified and experienced expert.

The proposed bridge will avoid direct effects on stream and wetland habitats and fish passage. The removal of the existing culvert will reinstate an area of wetland and streambed and result in a net gain in ecological values. Surface flows from the active fill areas will be diverted into sediment retention ponds, with treated water discharged into Stream 1, 3 and Wetland E. These ponds will have high sediment removal efficiencies, with treated runoff expected to contain low levels of residual solids, which may result in some localised, minor sediment deposition downstream of the pond discharge points and periodic increases in suspected sediment concentrations. The extent of effects at these locations is likely to be relatively small and adverse effects on stream and wetland ecological values including biodiversity and abundance of plants and animals is likely to be low. Where surface flows are directed into stormwater treatment, flows in Streams 2 and 3 may be reduced. These are Intermittent Streams and hydrological functions will be maintained. Hydrological functions in Wetland E will also be maintained as it has a large catchment uninfluenced by the project. The proposed vegetation removal is limited to hedgerows, rural specimen trees and a stand of macrocarpa trees, and ecological effects are likely to be low; however, we recommend bat checks prior to felling the macrocarpa trees if these are still in place. Adverse effects on the terrestrial SEA that adjoins Wetland E will be avoided.

We conclude that the project will avoid or minimise adverse ecological effects associated with the construction and operation of the managed fill. Furthermore, measures such as stream and wetland daylighting, riparian protection, and weed and pest control are likely to result in net positive ecological outcome.

7.0 References

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Appendix 1: River and Stream Definitions, Auckland Unitary Plan

River or stream

A continually or intermittently flowing body of fresh water, excluding ephemeral streams, and includes a stream or modified watercourse; but does not include any artificial watercourse (including an irrigation canal, water supply race, canal for the supply of water for electricity power generation, and farm drainage canal except where it is a modified element of a natural drainage system).

Ephemeral stream

Stream reaches with a bed above the water table at all times, with water only flowing during and shortly after rain events. This category is defined as those stream reaches that do not meet the definition of permanent river or stream or intermittent stream.

Intermittent stream

Stream reaches that cease to flow for periods of the year because the bed is periodically above the water table. This category is defined by those stream reaches that do not meet the definition of permanent river or stream and meet at least three of the following criteria:

- (a) it has natural pools;
- (b) it has a well-defined channel, such that the bed and banks can be distinguished;
- (c) it contains surface water more than 48 hours after a rain event which results in stream flow;
- (d) rooted terrestrial vegetation is not established across the entire cross-sectional width of the channel;
- (e) organic debris resulting from flood can be seen on the floodplain; or
- (f) there is evidence of substrate sorting process, including scour and deposition.

Permanent river or stream

The continually flowing reaches of any river or stream.

Appendix 2: SEV data

Function	Variable (code)	Site 1
	Vchann	0.25
	Vlining	0.90
	Vpipe	1.00
NFR	=	0.47
	Vbank	1.00
	Vrough	0.25
FLE	=	0.25
	Vbarr	0.30
CSM	=	0.30
	Vchanshape	0.90
	Vlining	0.90
CGW	=	0.90
	Hydraulic function mean score	0.48
	Vshade	0.20
WTC	=	0.20
	Vdod	0.60
DOM	=	0.60
	Vripar	0.10
	Vdecid	0.00
OMI	=	0.05
	Vmacro	0.94
	Vretain	0.20
IPR	=	0.20
	Vsurf	0.21
	Vripfilt	0.40
DOP	=	0.31
	Biogeochemical function mean score	0.27
	Vgalspwn	1.00
	Vgalqual	0.25
	Vgobspwn	0.10
FSH	=	0.18
	Vphyshab	0.18
	Vwatqual	0.12
	Vimperv	0.70
HAF	=	0.29
	Habitat provision function mean score	0.23
	Vfish	0.37
FFI	=	0.37
	Vmci	0.26
	Vept	0.17
	Vinvert	0.47
IFI	=	0.30
	Vripcond	0.18
	Vripconn	1.00
RVI	=	0.18
	Biodiversity function mean score	0.28
	Overall mean SEV score (maximum value 1)	0.33

Appendix 3: Vegetation Plot Data

Plot Number		1										
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture species	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC	Score (Prevalence)	Points (Prevalence)	
ldgr	30	y	<i>Lolium perenne</i>	Perennial Rye Grass		FACU	Y			4	120.0	
trrep	30	y	<i>Trifolium repens</i>	White Clover		FACU	Y			4	120.0	
ranrep	20	y	<i>Ranunculus repens</i>	Creeping Buttercup		FAC			Yes	3	60.0	
rumobl	15		<i>Rumex obtusifolius</i>	Broad-leaved Dock		FAC				3	45.0	
plalan	5		<i>Plantago lanceolata</i>	Narrow-leaved Plantain		FACU	Y			4	20.0	
Number of species: 5		Percent vegetation cover: 100		Number of dominant species: 3								
OPTIONAL indicators of wetland hydrology and hydric soil (1 = present, 0 = not present)												
Primary hydrology indicators						Secondary hydrology indicators						
1A. Surface water			2G. Inundation on aerial imagery			2K. Water-stained leaves						
1B. Groundwater <30 cm			2H. Sparsely vegetated concave surface			2L. Drainage patterns						
1C. Soil saturation <30 cm			2I. Salt crust			3E. Dry-season water table						
2A. Water marks			2J. Aquatic invertebrates			3F. Saturation in aerial imagery						
2B. Sediment deposits			3A. Hydrogen sulfide odour			4B. Geomorphic position						
2C. Drift deposits			3B. Oxidised rhizosphere on roots			4C. Shallow aquitard						
2D. Algal mat/crust			3C. Reduced iron			4D. FAC-neutral test						
2E. Iron deposits			3D. Reduced iron in filled soil			4E. Frost-heave hummocks						
2F. Surface soil cracks			4A. High water table stunted/stressed plants			Hydric Soil?:		n				
Clarkson 2013												
Wetland vegetation determination												
1. Rapid test score:		0%	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)			Fail						
2a. Dominance Test Score:		33%	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.			Fail						
2b. FAC dominants		33%	Are all or most dominants FAC?			No						
3. Indicators of hydric soil and wetland hydrology present?		No	YES (Pass) or NO (Fail)			Fail						
4. Prevalence Index Result:		3.7	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.			Fail						
Is it a wetland?			It's not wetland vegetation!									

Plot Number	3																		
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture species	Dominant Species is OBL, FACW, FAC	Dominant Species is OBL, FACW, FAC	Score (Prevalence)	Points (Prevalence)								
junef	40	Y	<i>Juncus effusus</i>	Leafless Rush		FACW		Yes	Yes	2	80.0								
junat	25	Y	<i>Juncus articulatus</i>	Jointed Rush		FACW		Yes	Yes	2	50.0								
lotped	10		<i>Lotus pedunculatus</i>	Lotus		FAC	Y			3	30.0								
plalan	10		<i>Plantago lanceolata</i>	Narrow-leaved Plantain		FACU	Y			4	40.0								
pasal	2		<i>Paspalum dilatatum</i>	Paspalum		FACU	Y			4	8.0								
cenun	5		<i>Centella uniflora</i>	Centella		FACW	Y			2	10.0								
cyndac	2		<i>Cynodon dactylon</i>	Bermuda Grass		FACU				4	8.0								
pruvul	2		<i>Prunella vulgaris</i>	Selfheal		FACU				4	8.0								
bellper	2		<i>Bellis perennis</i>	Bellis Daisy		FACU				4	8.0								
Number of species: 9		Percent vegetation cover: 98	Number of dominant species: 2																
OPTIONAL indicators of wetland hydrology and hydric soil. (1 = present, 0 = not present)																			
Primary hydrology indicators						Secondary hydrology indicators													
1A. Surface water			2G. Inundation on aerial imagery			2K. Water-stained leaves		<div>Pasture exclusion test:</div> <table><tr><td>Pasture cover</td><td>22</td></tr><tr><td>Vegetation cover</td><td>98</td></tr><tr><td colspan="2">0.22489796</td></tr><tr><td colspan="2">This is not pasture</td></tr></table>				Pasture cover	22	Vegetation cover	98	0.22489796		This is not pasture	
Pasture cover	22																		
Vegetation cover	98																		
0.22489796																			
This is not pasture																			
1B. Groundwater <30 cm			2H. Sparsely vegetated concave surface			2L. Drainage patterns													
1C. Soil saturation <30 cm	1		2I. Salt crust			2M. Dry-season water table													
2A. Water marks			2J. Aquatic invertebrates			2F. Saturation in aerial imagery													
2B. Sediment deposits			3A. Hydrogen sulfide odour			4B. Geomorphic position													
2C. Drift deposits			3B. Oxidised rhizosphere on roots			4C. Shallow aquitard													
2D. Algal mat/crust			3C. Reduced iron			4D. FAC-neutral test													
2E. Iron deposits			3D. Reduced iron in filled soil			4E. Frost-heave hummocks													
2F. Surface soil cracks			4A. High water table stunted/stressed plants			Hydric Soil?	1												
Clarkson 2013						MFE 2021													
Wetland vegetation determination																			
1. Rapid test score:	100%	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)	Pass																
2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.	Pass																
2b. FAC dominants	0%	Are all or most dominants FAC?	No																
3. Indicators of hydric soil and wetland hydrology present?	Yes	YES (Pass) or NO (Fail)	Pass																
4. Prevalence Index Result:	2.5	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.	Pass																
Is it a wetland?	It's wetland vegetation!																		

Plot Number	centre of wetland										
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture species	Dominant Species is OBL, FACW, FAC	Dominant Species is OBL, FACW, FAC	Score (Prevalence)	Points (Prevalence)
macrub	40	y	<i>Machaerina rubiginosa</i>	Baumea	Not Threatened	OBL		Yes	Yes	1	40.0
junat	30	y	<i>Juncus articulatus</i>	Jointed Rush		FACW		Yes	Yes	2	60.0
junef	10		<i>Juncus effusus</i>	Leafless Rush		FACW				2	20.0
holian	5		<i>Holcus lanatus</i>	Yorkshire Fog		FAC	Y			3	15.0
lotped	5		<i>Lotus pedunculatus</i>	Lotus		FAC	Y			3	15.0
cenun	2		<i>Centella uniflora</i>	Centella		FACW				2	4.0
blemin	4		<i>Blechnum minus</i>	Swamp Kiokio	Not Threatened	FACW				2	8.0
sphsag	4		<i>Sphagnum</i> species			OBL				1	4.0
Number of species: 8			Percent vegetation cover: 100		Number of dominant species: 2						
OPTIONAL indicators of wetland hydrology and hydric soil (1 = present, 0 = not present)											
Primary hydrology indicators						Secondary hydrology indicators					
1A. Surface water	1		2G. Inundation on aerial imagery			2K. Water-stained leaves	Pasture exclusion test:				
1B. Groundwater <30 cm	1		2H. Sparsely vegetated concave surface			2L. Drainage patterns	Pasture cover	10			
1C. Soil saturation <30 cm			2I. Salt crust			2M. Dry-season water table	Vegetation cover	100			
2A. Water marks			2J. Aquatic invertebrates			2F. Saturation in aerial imagery	0.1				
2B. Sediment deposits			3A. Hydrogen sulfide odour			4B. Geomorphic position	This is not pasture				
2C. Drift deposits			3B. Oxidised rhizosphere on roots			4C. Shallow aquitard					
2D. Algal mat/crust			3C. Reduced iron			4D. FAC-neutral test					
2E. Iron deposits			3D. Reduced iron in filled soil			4E. Frost-heave hummocks					
2F. Surface soil cracks			4A. High water table stunted/stressed plants			Hydric Soil?	1				
Clarkson 2013						WFE 2021					
Wetland vegetation determination											
1. Rapid test score:	100%	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)	Pass								
2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.	Pass								
2b. FAC dominants	0%	Are all or most dominants FAC?	No								
3. Indicators of hydric soil and wetland hydrology present?	Yes	YES (Pass) or NO (Fail)	Pass								
4. Prevalence Index Result:	1.7	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.	Pass								
Is it a wetland?	It's wetland vegetation!										

Wetland determination			
1. Rapid test score:	100%	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)	Pass
2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.	Pass
2b. Prevalence Index Score:	1.66	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.	Pass
3. Dominance + Prevalence		Passes Both	
4a. Indicators of wetland hydrology present?	Yes	YES (Pass) or NO (Fail)	Passes Hydrology Test
4b. Indicators of hydric soil present?	Yes	YES (Pass) or NO (Fail)	Passes Soil Test
Is it a wetland?	It's a Wetland under the RMA!		

[illegible]

Plot Number		6															
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture species	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC	Score (Prevalence)	Points (Prevalence)						
linedg	20	y	<i>Juncus edgariae</i>	Wharf	Not Threatened	FACW		Yes	Yes	2	40.0						
lotped	10		<i>Lotus pedunculatus</i>	Lotus		FAC	Y			3	30.0						
isopro	35	y	<i>Isoplepis proflera</i>	Three Square	Not Threatened	OBL		Yes	Yes	1	35.0						
ranrep	5		<i>Ranunculus repens</i>	Creeping Buttercup		FAC				3	15.0						
perhyd	5		<i>Pericallis hydrogryper</i>	Water Pepper		FACW				2	10.0						
pasdli	5		<i>Paspalum dilatatum</i>	Paspalum		FACU	Y			4	20.0						
holian	5		<i>Holcus lanatus</i>	Yorkshire Fog		FAC	Y			3	15.0						
juntar	15		<i>Juncus articulatus</i>	Jointed Rush		FACW				2	30.0						
Number of species: 8		Percent vegetation cover: 100	Number of dominant species: 2														
OPTIONAL indicators of wetland hydrology and hydric soil (1 = present, 0 = not present)																	
Primary hydrology indicators						Secondary hydrology indicators											
1A. Surface water	1		2G. Inundation on aerial imagery			2K. Water-stained leaves		Pasture exclusion test:									
1B. Groundwater <30 cm			2H. Sparsely vegetated concave surface			2L. Drainage patterns		Pasture cover	20								
1C. Soil saturation <30 cm			2I. Salt crust			3E. Dry-season water table		Vegetation cover	100								
2A. Water marks			2J. Aquatic invertebrates			3F. Saturation in aerial imagery		0.2									
2B. Sediment deposits			3A. Hydrogen sulfide odour			4B. Geomorphic position		This is not pasture									
2C. Drift deposits			3B. Oxidised rhizosphere on roots			4C. Shallow aquitard											
2D. Algal mat/crust			3C. Reduced iron			4D. FAC-neutral test											
2E. Iron deposits			3D. Reduced iron in filled soil			4E. Frost-heave hummocks											
2F. Surface soil cracks			4A. High water table stunted/stressed plants			Hydric Soil?	1										
Clarkson 2013						MFE 2021											
Wetland vegetation determination						Wetland determination											
1. Rapid test score:	100%	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)	Pass			1. Rapid test score:	100%	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)	Pass								
2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.	Pass			2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.	Pass								
2b. FAC dominants	0%	Are all or most dominants FAC?	No			2b. Prevalence Index Score:	1.95	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.	Pass								
3. Indicators of hydric soil and wetland hydrology present?	Yes	YES (Pass) or NO (Fail)	Pass			3. Dominance + Prevalence			Passes Both								
4. Prevalence Index Result:	2.0	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.	Pass			4a. Indicators of wetland hydrology present?	Yes	YES (Pass) or NO (Fail)	Passes Hydrology Test								
Is it a wetland?	It's wetland vegetation!					4b. Indicators of hydric soil present?	Yes	YES (Pass) or NO (Fail)	Passes Soil Test								
						Is it a wetland?	It's a Wetland under the RMA!										

Plot Number		7															
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture species	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC	Score (Prevalence)	Points (Prevalence)						
ranrep	20		<i>Ranunculus repens</i>	Creeping Buttercup		FAC				3	60.0						
pasdli	15		<i>Paspalum dilatatum</i>	Paspalum		FACU	Y			4	60.0						
plalan	5		<i>Plantago lanceolata</i>	Narrow-leaved Plantain		FACU	Y			4	20.0						
lotped	5		<i>Lotus pedunculatus</i>	Lotus		FAC	Y			3	15.0						
leosax	2		<i>Leontodon saxatilis</i>			FAC				3	6.0						
jureff	25	y	<i>Juncus effusus</i>	Leafless Rush		FACW		Yes	Yes	2	50.0						
lgher	25	y	<i>Lolium perenne</i>	Perennial Rye Grass		FACU	Y			4	100.0						
trirep	3		<i>Trifolium repens</i>	White Clover		FACU	Y			4	12.0						
Number of species: 8		Percent vegetation cover: 100	Number of dominant species: 2														
OPTIONAL indicators of wetland hydrology and hydric soil (1 = present, 0 = not present)																	
Primary hydrology indicators						Secondary hydrology indicators											
1A. Surface water			2G. Inundation on aerial imagery			2K. Water-stained leaves		Pasture exclusion test:									
1B. Groundwater <30 cm			2H. Sparsely vegetated concave surface			2L. Drainage patterns	1	Pasture cover	53								
1C. Soil saturation <30 cm	1		2I. Salt crust			3E. Dry-season water table		Vegetation cover	100								
2A. Water marks			2J. Aquatic invertebrates			3F. Saturation in aerial imagery		0.53									
2B. Sediment deposits			3A. Hydrogen sulfide odour			4B. Geomorphic position		This is pasture									
2C. Drift deposits			3B. Oxidised rhizosphere on roots			4C. Shallow aquitard											
2D. Algal mat/crust			3C. Reduced iron			4D. FAC-neutral test											
2E. Iron deposits			3D. Reduced iron in filled soil			4E. Frost-heave hummocks											
2F. Surface soil cracks			4A. High water table stunted/stressed plants			Hydric Soil?	1										
Clarkson 2013						MFE 2021											
Wetland vegetation determination						Wetland determination											
1. Rapid test score:	50%	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)	Fail			1. Rapid test score:	50%	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)	Fail								
2a. Dominance Test Score:	50%	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.	Fail			2a. Dominance Test Score:	50%	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.	Fail								
2b. FAC dominants	0%	Are all or most dominants FAC?	No			2b. Prevalence Index Score:	3.23	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.	Fail								
3. Indicators of hydric soil and wetland hydrology present?	Yes	YES (Pass) or NO (Fail)	Pass			3. Dominance + Prevalence			Fails Both								
4. Prevalence Index Result:	3.2	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.	Fail, But Score is Borderline			4a. Indicators of wetland hydrology present?	Yes	YES (Pass) or NO (Fail)	Passes Hydrology Test								
Is it a wetland?	It's not wetland vegetation, but result is marginal					4b. Indicators of hydric soil present?	Yes	YES (Pass) or NO (Fail)	Passes Soil Test								
						Is it a wetland?	It's Not a Wetland under the RMA!										

Plot Number		8 - within wetland centre											
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture species	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC	Score (Prevalence)	Points (Prevalence)		
micrb	50	y	<i>Machaena rubiginosa</i>	<i>Baumea</i>	<i>Not Threatened</i>	OBL		Yes	Yes	1	50.0		
lunef	20	y	<i>Juncus effusus</i>	<i>Leafless Rush</i>		FACW		Yes	Yes	2	40.0		
isopro	30	y	<i>Isolpis proflera</i>	<i>Three Square</i>	<i>Not Threatened</i>	OBL		Yes	Yes	1	30.0		
Number of species: 3		Percent vegetation cover: 100		Number of dominant species: 3									
OPTIONAL indicators of wetland hydrology and hydric soil (1 = present, 0 = not present)													
Primary hydrology indicators						Secondary hydrology indicators							
1A. Surface water	1		2G. Inundation on aerial imagery			2K. Water-stained leaves		Pasture exclusion test:					
1B. Groundwater <30 cm	1		2H. Sparsely vegetated concave surface			2L. Drainage patterns		Pasture cover	0				
1C. Soil saturation <30 cm			2I. Salt crust			2M. Dry-season water table		Vegetation cover	100				
2A. Water marks			2J. Aquatic invertebrates			3F. Saturation in aerial imagery		0					
2B. Sediment deposits			3A. Hydrogen sulfide odour			4B. Geomorphic position		This is not pasture					
2C. Drift deposits			3B. Oxidised rhizosphere on roots			4C. Shallow aquifer							
2D. Algal mat/crust			3C. Reduced iron			4D. FAC-neutral test							
2E. Iron deposits			3D. Reduced iron in filled soil			4E. Frost-heave hummocks							
2F. Surface soil cracks			4A. High water table stunted/stressed plants			Hydric Soil?	1						
Clarkson 2013						MFE 2021							
Wetland vegetation determination						Wetland determination							
1. Rapid test score:	100%	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)	Pass			1. Rapid test score:	100%	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)	Pass				
2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.	Pass			2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.	Pass				
2b. FAC dominants	0%	Are all or most dominants FAC?	No			2b. Prevalence Index Score:	1.20	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.	Pass				
3. Indicators of hydric soil and wetland hydrology present?	Yes	YES (Pass) or NO (Fail)	Pass			3. Dominance + Prevalence			Passes Both				
4. Prevalence Index Result:	1.2	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.	Pass			4a. Indicators of wetland hydrology present?	Yes	YES (Pass) or NO (Fail)	Passes Hydrology Test				
Is it a wetland?	It's wetland vegetation!					4b. Indicators of hydric soil present?	Yes	YES (Pass) or NO (Fail)	Passes Soil Test				
						Is it a wetland?	It's a Wetland under the RMA!						

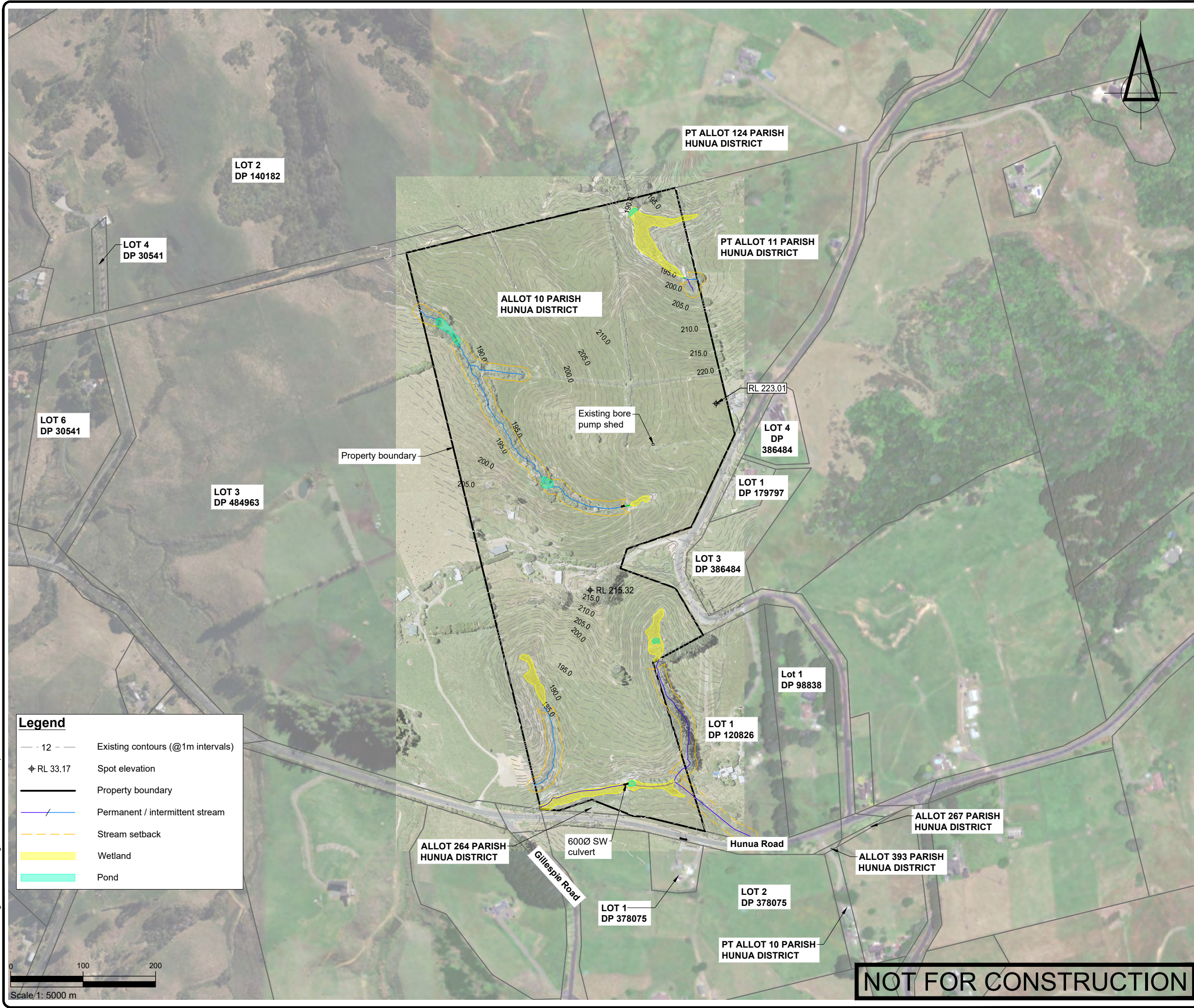
Plot Number		9											
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture species	Dominant Species is OBL, FACW	Dominant Species is OBL, FACW, FAC	Score (Prevalence)	Points (Prevalence)		
pasda	50	y	<i>Paspalum distichum</i>	<i>Mercer Grass</i>		FACW		Yes	Yes	2	100.0		
perthd	20	y	<i>Persicaria hydropiper</i>	<i>Water Pepper</i>		FACW		Yes	Yes	2	40.0		
junedg	15		<i>Juncus edgariae</i>	<i>Wier</i>	<i>Not Threatened</i>	FACW				2	30.0		
rubfru	5		<i>Rubus fruticosus</i>	<i>Blackberry</i>		FAC				3	15.0		
rumobt	5		<i>Rumex obtusifolius</i>	<i>Broad-leaved Dock</i>		FAC				3	15.0		
pasdl	5		<i>Paspalum dilatatum</i>	<i>Paspalum</i>		FACU	Y			4	20.0		
Number of species: 6		Percent vegetation cover: 100		Number of dominant species: 2									
OPTIONAL indicators of wetland hydrology and hydric soil (1 = present, 0 = not present)													
Primary hydrology indicators						Secondary hydrology indicators							
1A. Surface water			2G. Inundation on aerial imagery			2K. Water-stained leaves		Pasture exclusion test:					
1B. Groundwater <30 cm			2H. Sparsely vegetated concave surface			2L. Drainage patterns		Pasture cover	5				
1C. Soil saturation <30 cm	1		2I. Salt crust			2M. Dry-season water table		Vegetation cover	100				
2A. Water marks			2J. Aquatic invertebrates			3F. Saturation in aerial imagery		0.05					
2B. Sediment deposits			3A. Hydrogen sulfide odour			4B. Geomorphic position		This is not pasture					
2C. Drift deposits			3B. Oxidised rhizosphere on roots			4C. Shallow aquifer							
2D. Algal mat/crust			3C. Reduced iron			4D. FAC-neutral test							
2E. Iron deposits			3D. Reduced iron in filled soil			4E. Frost-heave hummocks							
2F. Surface soil cracks			4A. High water table stunted/stressed plants			Hydric Soil?	1						
Clarkson 2013						MFE 2021							
Wetland vegetation determination						Wetland determination							
1. Rapid test score:	100%	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)	Pass			1. Rapid test score:	100%	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)	Pass				
2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.	Pass			2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.	Pass				
2b. FAC dominants	0%	Are all or most dominants FAC?	No			2b. Prevalence Index Score:	2.20	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.	Pass				
3. Indicators of hydric soil and wetland hydrology present?	Yes	YES (Pass) or NO (Fail)	Pass			3. Dominance + Prevalence			Passes Both				
4. Prevalence Index Result:	2.2	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.	Pass			4a. Indicators of wetland hydrology present?	Yes	YES (Pass) or NO (Fail)	Passes Hydrology Test				
Is it a wetland?	It's wetland vegetation!					4b. Indicators of hydric soil present?	Yes	YES (Pass) or NO (Fail)	Passes Soil Test				
						Is it a wetland?	It's a Wetland under the RMA!						

Plot Number	10												
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture species	Dominant Species is OBL, FACW, FAC	Dominant Species is OBL, FACW, FAC	Score (Prevalence)	Points (Prevalence)		
pasdis	40	Y	<i>Paspalum distichum</i>	Mercer Grass		FACW		Yes	Yes	2	80.0		
junefl	20	Y	<i>Juncus effusus</i>	Leafless Rush		FACW		Yes	Yes	2	40.0		
ranrep	10		<i>Ranunculus repens</i>	Creeping Buttercup		FAC				3	30.0		
lotped	10		<i>Lotus pedunculatus</i>	Lotus		FAC	Y			3	30.0		
holfln	5		<i>Holcus lanatus</i>	Yorkshire Fog		FAC				3	15.0		
junedq	5		<i>Juncus edgariae</i>	Wiwir	Not Threatened	FACW	Y			2	10.0		
pasdli	5		<i>Paspalum dilatatum</i>	Paspalum		FACU	Y			4	20.0		
isopro	5		<i>Isolepis proflera</i>	Three Square	Not Threatened	OBL				1	5.0		
Number of species: 8 Percent vegetation cover: 100 Number of dominant species: 2													
OPTIONAL indicators of wetland hydrology and hydric soil (1 = present, 0 = not present)													
Primary hydrology indicators						Secondary hydrology indicators						Pasture exclusion test:	
1A. Surface water	1		2G. Inundation on aerial imagery			2K. Water-stained leaves						Pasture cover	20
1B. Groundwater <30 cm	1		2H. Sparsely vegetated concave surface			2L. Drainage patterns						Vegetation cover	100
1C. Soil saturation <30 cm			2I. Salt crust			3E. Dry-season water table						0.2	
2A. Water marks			2J. Aquatic invertebrates			3F. Saturation in aerial imagery						This is not pasture	
2B. Sediment deposits			3A. Hydrogen sulfide odour			4B. Geomorphic position							
2C. Drift deposits			3B. Oxidised rhizosphere on roots			4C. Shallow aquitard							
2D. Algal mat/crust			3C. Reduced iron			4D. FAC-neutral test							
2E. Iron deposits			3D. Reduced iron in filled soil			4E. Frost-heave hummocks							
2F. Surface soil cracks			4A. High water table stunted/stressed plants			Hydric Soil?	1						
Clarkson 2013													
Wetland vegetation determination						Wetland determination							
1. Rapid test score:	100%	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)		Pass		1. Rapid test score:	100%	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)		Pass			
2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.		Pass		2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.		Pass			
2b. FAC dominants	0%	Are all or most dominants FAC?		No		2b. Prevalence Index Score:	2.30	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.		Pass			
3. Indicators of hydric soil and wetland hydrology present?	Yes	YES (Pass) or NO (Fail)		Pass		3. Dominance + Prevalence				Passes Both			
4. Prevalence Index Result:	2.3	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.		Pass		4a. Indicators of wetland hydrology present?	Yes	YES (Pass) or NO (Fail)		Passes Hydrology Test			
Is it a wetland?		It's wetland vegetation!				4b. Indicators of hydric soil present?	Yes	YES (Pass) or NO (Fail)		Passes Soil Test			
						Is it a wetland?		It's a Wetland under the RMA!					

Plot Number	11												
6-letter code	% Cover	Dominant (50/20 rule) Y / N	Species Name	Common Name	Threat Status	Wetland Status	Pasture species	Dominant Species is OBL, FACW, FAC	Dominant Species is OBL, FACW, FAC	Score (Prevalence)	Points (Prevalence)		
macrub	25	Y	<i>Machaera rubiginosa</i>	Baumea	Not Threatened	OBL		Yes	Yes	1	25.0		
perthyd	15		<i>Persicaria hydropiper</i>	Water Pepper		FACW				2	30.0		
pasdis	35	Y	<i>Paspalum distichum</i>	Mercer Grass		FACW		Yes	Yes	2	70.0		
isopro	25		<i>Isolepis proflera</i>	Three Square	Not Threatened	OBL				1	25.0		
Number of species: 4 Percent vegetation cover: 100 Number of dominant species: 2													
OPTIONAL indicators of wetland hydrology and hydric soil (1 = present, 0 = not present)													
Primary hydrology indicators						Secondary hydrology indicators						Pasture exclusion test:	
1A. Surface water	1		2G. Inundation on aerial imagery			2K. Water-stained leaves						Pasture cover	0
1B. Groundwater <30 cm			2H. Sparsely vegetated concave surface			2L. Drainage patterns						Vegetation cover	100
1C. Soil saturation <30 cm			2I. Salt crust			3E. Dry-season water table						0	
2A. Water marks			2J. Aquatic invertebrates			3F. Saturation in aerial imagery						This is not pasture	
2B. Sediment deposits			3A. Hydrogen sulfide odour			4B. Geomorphic position							
2C. Drift deposits			3B. Oxidised rhizosphere on roots			4C. Shallow aquitard							
2D. Algal mat/crust			3C. Reduced iron			4D. FAC-neutral test							
2E. Iron deposits			3D. Reduced iron in filled soil			4E. Frost-heave hummocks							
2F. Surface soil cracks			4A. High water table stunted/stressed plants			Hydric Soil?	1						
Clarkson 2013													
Wetland vegetation determination						Wetland determination							
1. Rapid test score:	100%	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)		Pass		1. Rapid test score:	100%	Wetland if all dominant species across all strata rated OBL and/or FACW (pass score = 100%)		Pass			
2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.		Pass		2a. Dominance Test Score:	100%	Wetland if more than 50% of dominant species across all strata are rated OBL, FACW, or FAC using the 50/20 rule.		Pass			
2b. FAC dominants	0%	Are all or most dominants FAC?		No		2b. Prevalence Index Score:	1.50	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.		Pass			
3. Indicators of hydric soil and wetland hydrology present?	Yes	YES (Pass) or NO (Fail)		Pass		3. Dominance + Prevalence				Passes Both			
4. Prevalence Index Result:	1.5	Wetland if PI ≤ 3.0, but values around 3.0 should be used alongside other wetland indicators.		Pass		4a. Indicators of wetland hydrology present?	Yes	YES (Pass) or NO (Fail)		Passes Hydrology Test			
Is it a wetland?		It's wetland vegetation!				4b. Indicators of hydric soil present?	Yes	YES (Pass) or NO (Fail)		Passes Soil Test			
						Is it a wetland?		It's a Wetland under the RMA!					

Appendix 4. Engineering Plans prepared by Fraser Thomas Limited

P:\33 series\33250\03 Drawings\33250-002.dwg, f:\hina, 11/10/2024 2:51 pm



Legend

- - - Existing contours (@1m intervals)
- ⊕ RL 33.17 Spot elevation
- Property boundary
- / — Permanent / intermittent stream
- - - Stream setback
- Wetland
- Pond

SURVEYED	TB	06.09.24	APPROVED	SF	DATE
DESIGNED	TB	06.09.24			
DRAWN	FV	06.09.24			
CHECKED	TB	06.09.24			
REVISION	CHANGES			CHECKED	DATE

NOTES

1. Existing Ground Contour data obtained from LiDAR 2016.

PROJECT DATUMS:
LEVEL: Auckland Vertical Datum 1946
COORDINATE: NZGD2000 / Mount Eden 2000

CLIENT

SCARBRO ENVIRONMENTAL LTD

PROJECT

362 JONES RD, HUNUA

TITLE

EXISTING SITE PLAN



Fraser Thomas

ENGINEERS • RESOURCE MANAGERS • SURVEYORS

AUCKLAND 09 278 7078
HAWKE'S BAY 06 211 2766
CHRISTCHURCH 03 358 5936
BLENHEIM 03 428 3292
NELSON 03 222 1132
TAURANGA 020 4118 9465

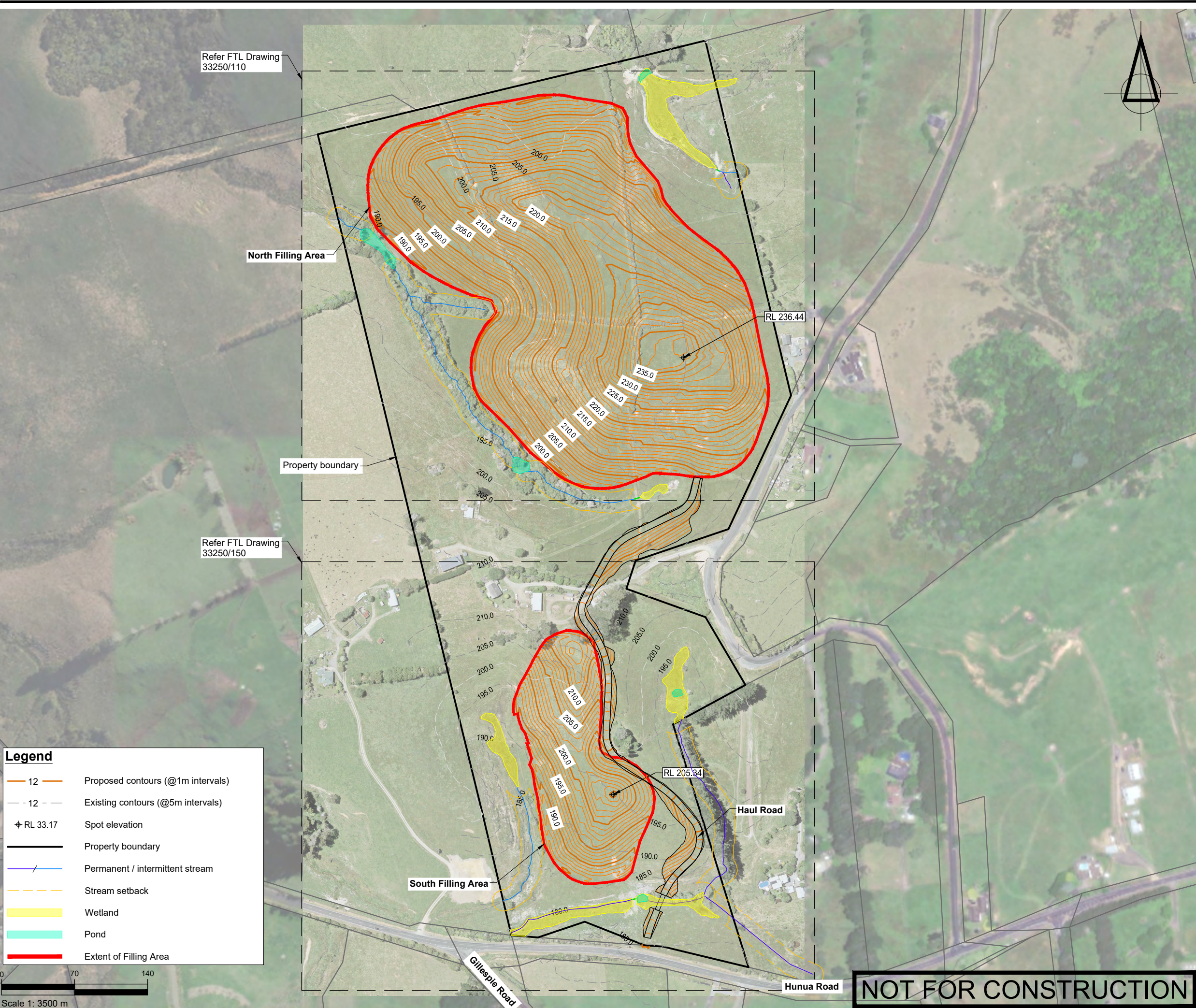
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STATUS	
FOR RESOURCE CONSENT	
Construction works shall commence only on receipt of and in accordance with the Council or Council organisation stamped approved drawings, unless otherwise indicated.	
SCALE	1:5000 (A3)
DRAWING No	33250/002
REVISION	-

NOT FOR CONSTRUCTION

P:\333 series\33250\03 Drawings\33250-100.dwg, crouse, 11/10/2024 2:51 pm



Legend	
	12 Proposed contours (@1m intervals)
	12 Existing contours (@5m intervals)
	RL 33.17 Spot elevation
	Property boundary
	Permanent / intermittent stream
	Stream setback
	Wetland
	Pond
	Extent of Filling Area

SURVEYED			APPROVED	DATE
DESIGNED				
DRAWN				
CHECKED				
REVISION	CHANGES		CHECKED	DATE

NOTES

1. Existing Ground Contour data obtained from LiDAR 2016.

PROJECT DATUMS:
LEVEL: Auckland Vertical Datum 1946
COORDINATE: NZGD2000 / Mount Eden 2000

CLIENT

SCARBRO ENVIRONMENTAL LTD

PROJECT

362 JONES RD, HUNUA

TITLE

PROPOSED ACCESSWAY LAYOUT



Fraser

Thomas

ENGINEERS • RESOURCE MANAGERS • SURVEYORS

AUCKLAND

HAWKE'S BAY

CHRISTCHURCH

BLenheim

NELSON

TAURANGA

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06 211 2766

03 358 5936

03 428 3292

03 222 1132

020 4118 9465

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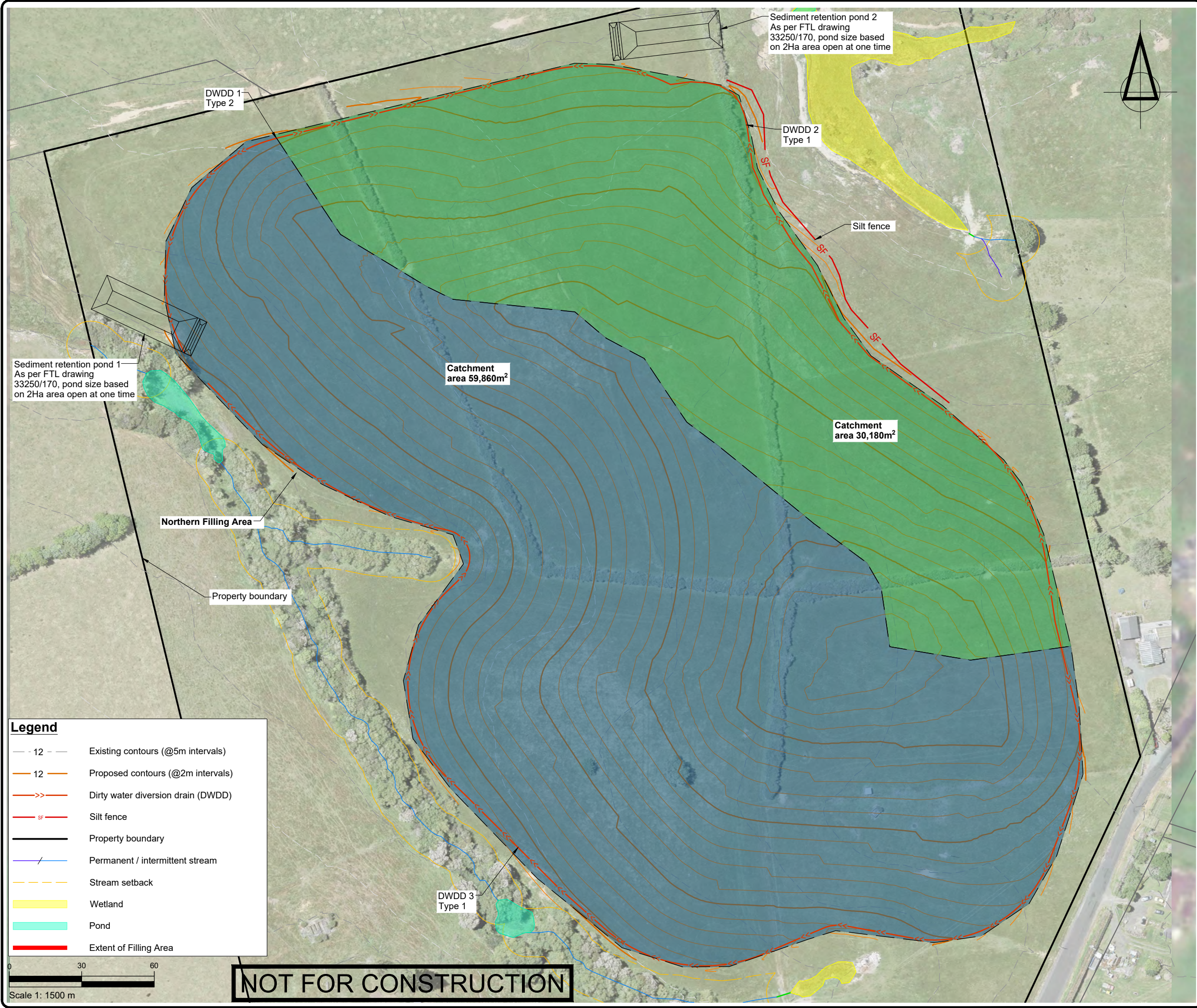
STATUS

FOR RESOURCE CONSENT

Construction works shall commence only on receipt of and in accordance with the Council or Council organisation stamped approved drawings, unless otherwise indicated.

SCALE	1:2000	(A3)
DRAWING No	33250/100	REVISION
		-

P:\33 series\33250\03 Drawings\33250-121-122.dwg, crouse, 11/10/2024 2:51 pm



SURVEYED	TB	06.09.24	APPROVED	SF	27.09.24
DESIGNED	TB	06.09.24			
DRAWN	FV	06.09.24			
CHECKED	TB	06.09.24			
REVISION	CHANGES			CHECKED	DATE

NOTES

- Existing Ground Contour data obtained from LiDAR 2016.
- Filling Area area will be staged. Open area to be progressively stabilised. Locations of final SRPs are shown indicatively, but other SRPs may be constructed as a part of the construction methodology.
- All works to be carried out in accordance with the Auckland Council Technical Publication GD05 Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region (GD05 June 2016).

PROJECT DATUMS:

LEVEL: Auckland Vertical Datum 1946

COORDINATE: NZGD2000 / Mount Eden 2000

CLIENT

SCARBRO ENVIRONMENTAL LTD

PROJECT

362 JONES RD, HUNUA

TITLE

PROPOSED NORTHERN
EROSION AND SEDIMENT
CONTROL PLAN

Fraser Thomas

ENGINEERS • RESOURCE MANAGERS • SURVEYORS

AUCKLAND 09 278 7078

HAWKE'S BAY 06 211 2766

CHRISTCHURCH 03 358 5936

BLenheim 03 428 3292

Nelson 03 222 1132

TAURANGA 020 4118 9465

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STATUS

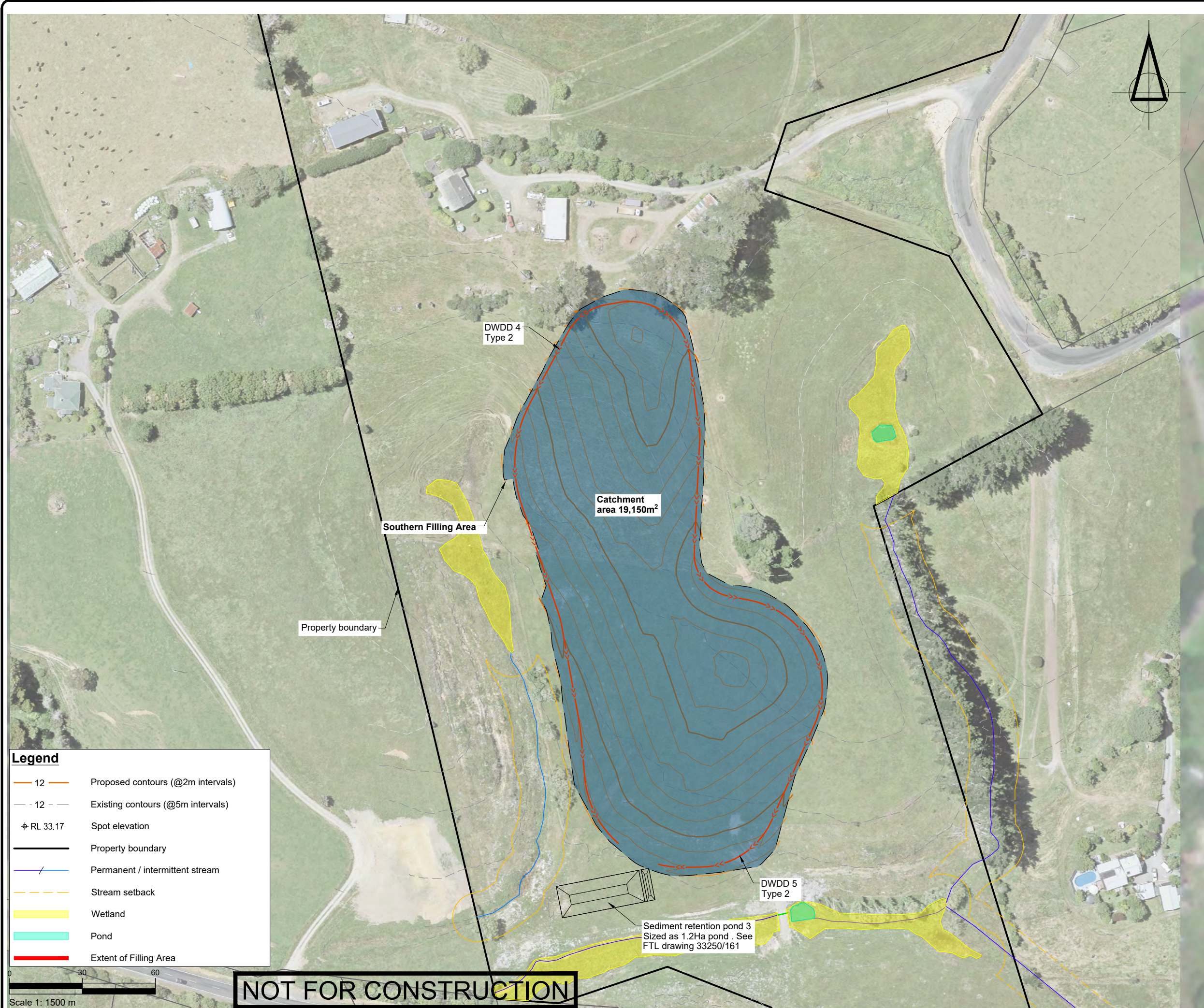
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Construction works shall commence only on receipt of and in accordance with the Council or Council organisation stamped approved drawings, unless otherwise indicated.

SCALE 1:1500 (A3)

DRAWING No 33250/121 REVISION -

P:\33 series\33250\03 Drawings\33250-161-162.dwg, crouse, 11/10/2024 2:52 pm



Legend

- 12 Proposed contours (@2m intervals)
- 12 - Existing contours (@5m intervals)
- ⊕ RL 33.17 Spot elevation
- Property boundary
- Permanent / intermittent stream
- Stream setback
- Wetland
- Pond
- Extent of Filling Area

SURVEYED	TB	06.09.24	APPROVED	SF	DATE
DESIGNED	TB	06.09.24			
DRAWN	FV	06.09.24			
CHECKED	TB	06.09.24			
REVISION	CHANGES			CHECKED	DATE

- NOTES
- Existing Ground Contour data obtained from LiDAR 2016.
 - Filling Area area will be staged. Open area to be progressively stabilised. Locations of final SRPs are shown indicatively, but other SRPs may be constructed as a part of the construction methodology.
 - All works to be carried out in accordance with the Auckland Council Technical Publication GD05 Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region (GD05 June 2016).

PROJECT DATUMS:
LEVEL: Auckland Vertical Datum 1946
COORDINATE: NZGD2000 / Mount Eden 2000

CLIENT
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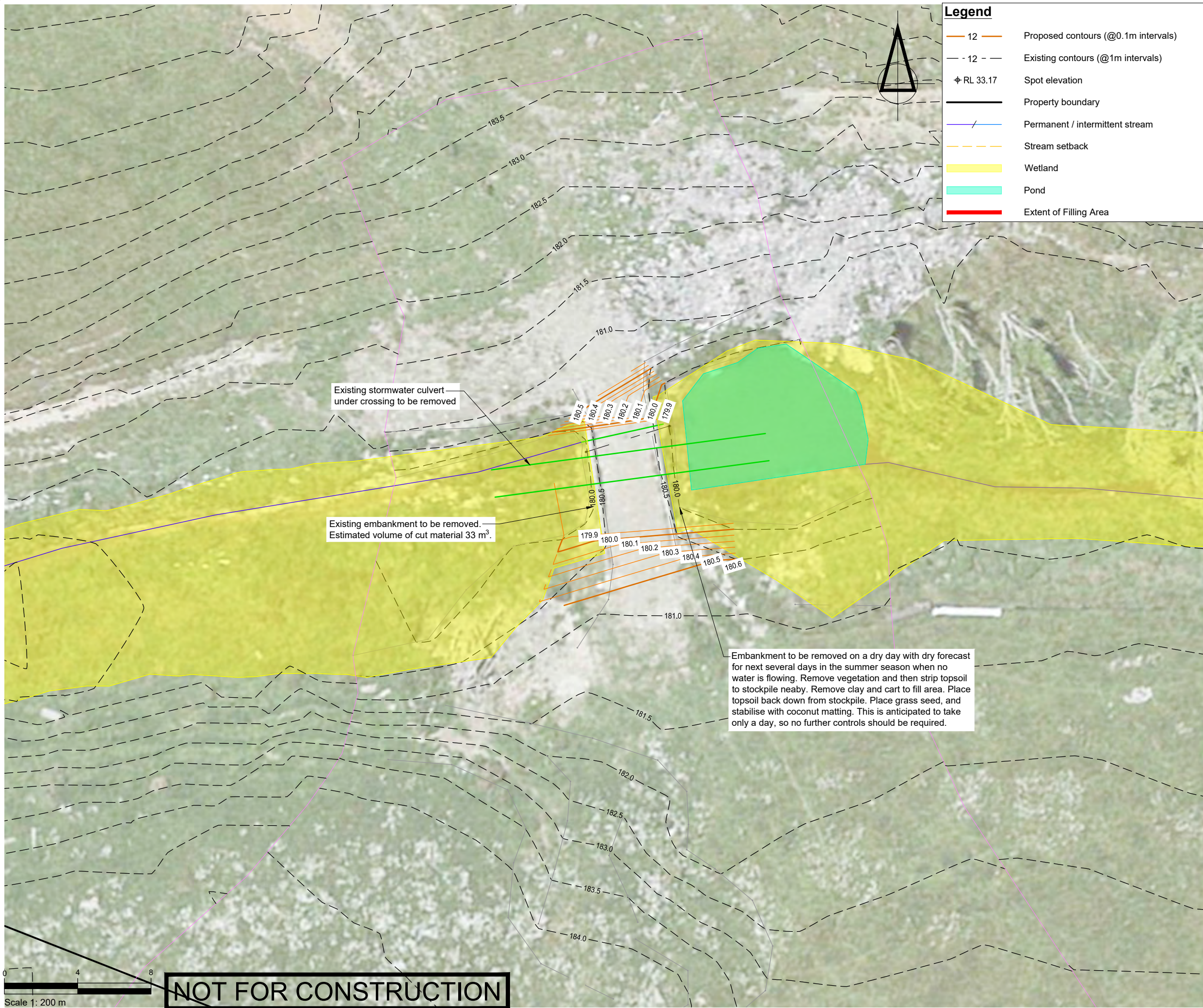
PROJECT
362 JONES RD, HUNUA

TITLE
PROPOSED SOUTHERN
EROSION AND SEDIMENT
CONTROL PLAN

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SCALE 1:1500 (A3)
DRAWING No 33250/161 REVISION -



SURVEYED	TB	06.09.24	APPROVED	SF	DATE
DESIGNED	TB	06.09.24			
DRAWN	FV	06.09.24			
CHECKED	TB	06.09.24			
REVISION	CHANGES			CHECKED	DATE

NOTES

1. Existing Ground Contour data obtained from LiDAR 2016 and FTL survey conducted on 04/04/2024

PROJECT DATUMS:

LEVEL: Auckland Vertical Datum 1946

COORDINATE: NZGD2000 / Mount Eden 2000

CLIENT

SCARBRO ENVIRONMENTAL LTD

PROJECT

362 JONES RD, HUNUA

TITLE

REMOVAL OF EXISTING STREAM CROSSING

Fraser Thomas

ENGINEERS • RESOURCE MANAGERS • SURVEYORS

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HAWKE'S BAY 06 211 2766

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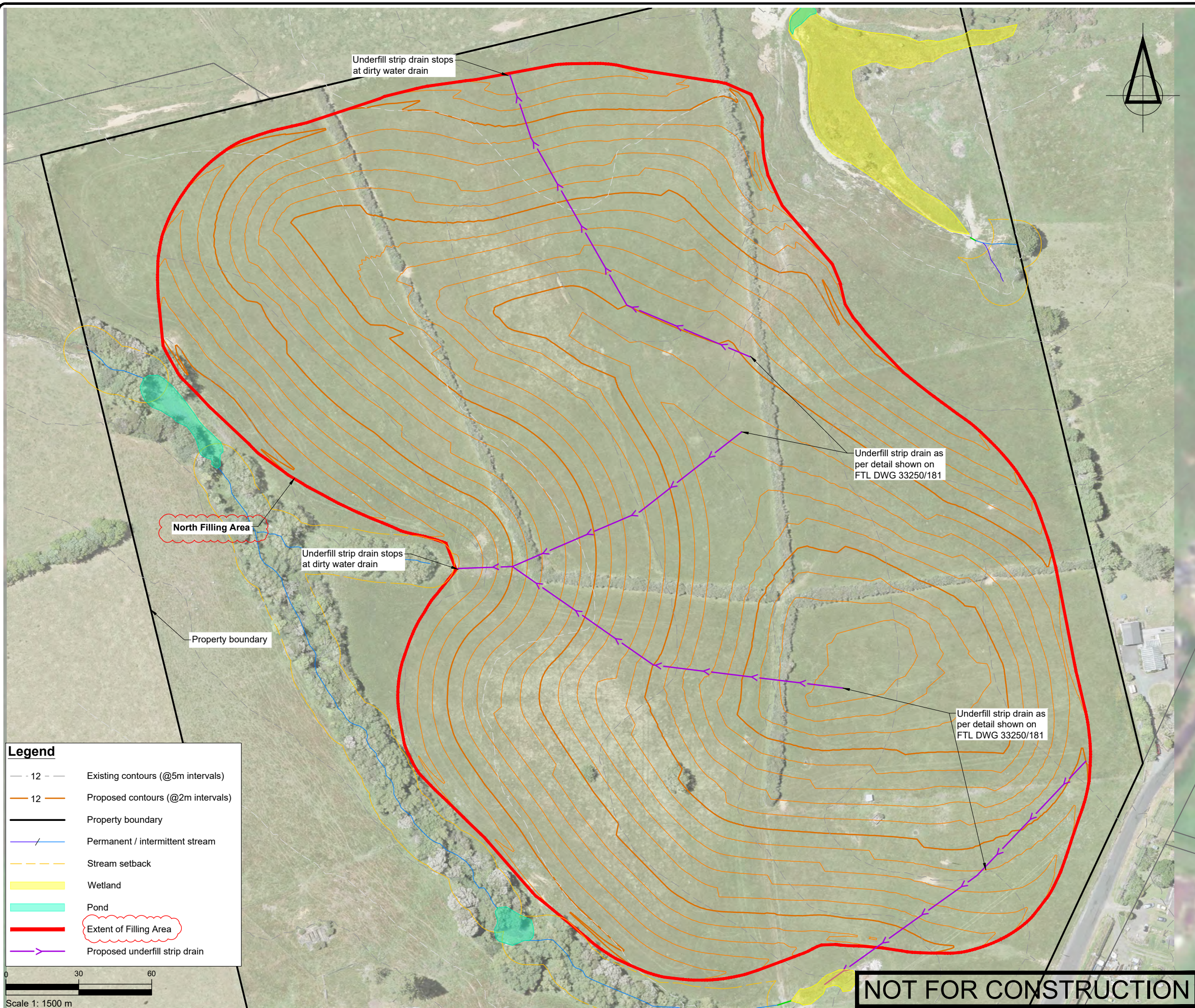
FOR RESOURCE CONSENT

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SCALE 1:200 (A3)

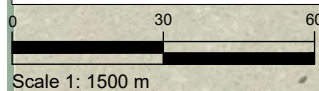
DRAWING No 33250/140 REVISION -

P:\33 series\33250\03 Drawings\33250-350.dwg, f:\ohra, 14/10/2024 1:28 pm



Legend

— 12 —	Existing contours (@5m intervals)
— 12 —	Proposed contours (@2m intervals)
— — —	Property boundary
— / —	Permanent / intermittent stream
— - - -	Stream setback
Yellow	Wetland
Green	Pond
Red outline	Extent of Filling Area
— > —	Proposed underfill strip drain



SURVEYED	TB	06.09.24	APPROVED	SF	DATE
DESIGNED	TB	06.09.24			
DRAWN	FV	06.09.24			
CHECKED	TB	06.09.24			
REVISION	CHANGES			CHECKED	DATE
A	MINOR TEXT AMENDMENTS			TB	14.10.24

NOTES

Existing Ground Contour data obtained from LiDAR 2016.

PROJECT DATUMS:

LEVEL: Auckland Vertical Datum 1946

COORDINATE: NZGD2000 / Mount Eden 2000

CLIENT

SCARBRO ENVIRONMENTAL LTD

PROJECT

362 JONES RD, HUNUA

TITLE

PROPOSED NORTHERN UNDERFILL STRIP DRAIN

Fraser Thomas

ENGINEERS • RESOURCE MANAGERS • SURVEYORS

AUCKLAND 09 278 7078

HAWKE'S BAY 06 211 2766

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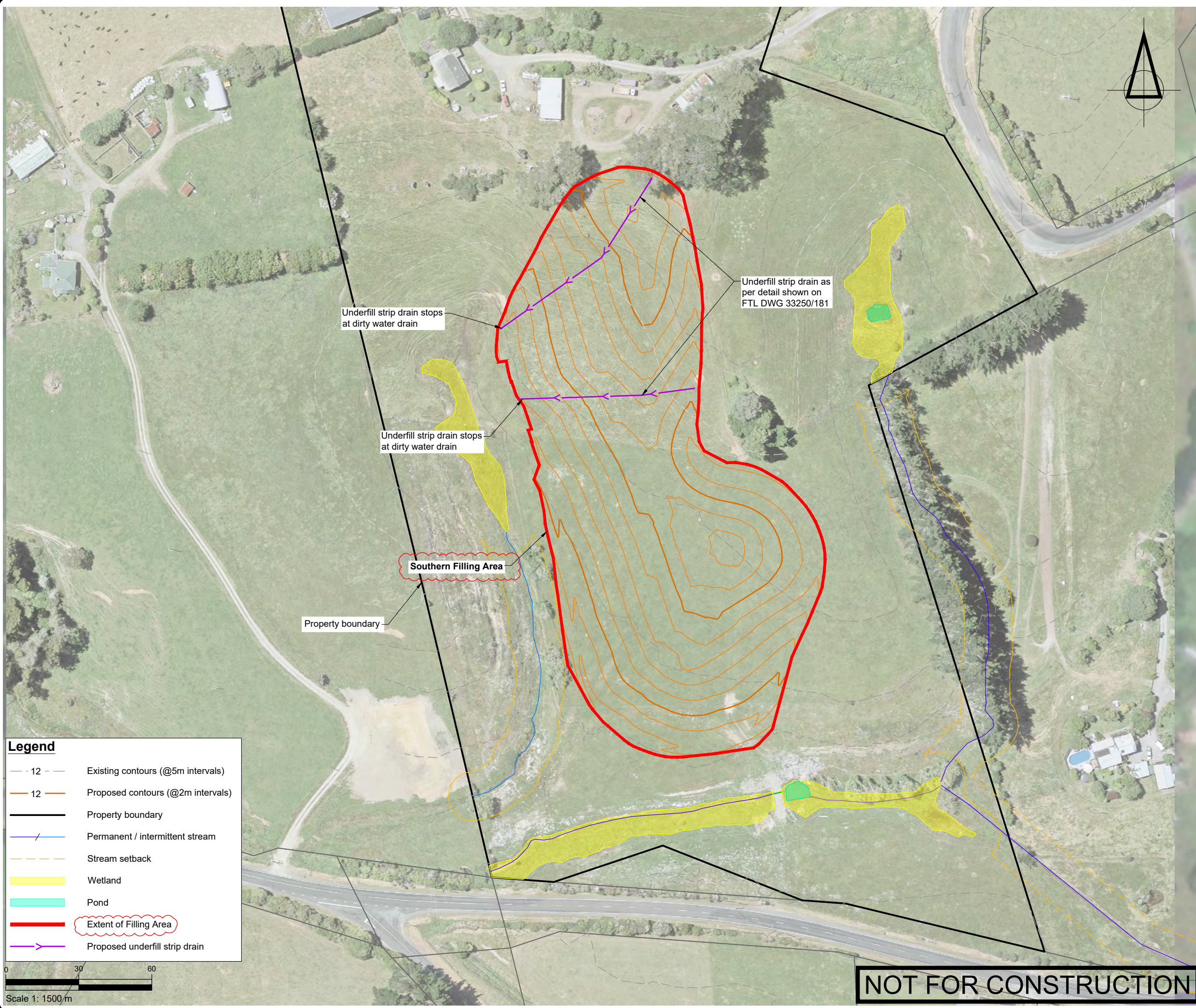
SCALE 1:1500 (A3)

DRAWING No 33250/350

REVISION A

NOT FOR CONSTRUCTION

P:\33 series\33250\03 Drawings\33250-351.dwg, f:\ohra, 14/10/2024 1:29 pm



Legend

- Existing contours (@5m intervals)
- Proposed contours (@2m intervals)
- Property boundary
- Permanent / intermittent stream
- Stream setback
- Wetland
- Pond
- Extent of Filling Area
- Proposed underfill strip drain

NOT FOR CONSTRUCTION

SURVEYED			APPROVED	DATE
DESIGNED	TB	06.09.24	SF	27.09.24
DRAWN	FV	06.09.24		
CHECKED	TB	06.09.24		
REVISION	CHANGES		CHECKED	DATE
A	MINOR TEXT AMENDMENTS		TB	14.10.24

NOTES

Existing Ground Contour data obtained from LiDAR 2016.

PROJECT DATUMS:

LEVEL: Auckland Vertical Datum 1946

COORDINATE: NZGD2000 / Mount Eden 2000

CLIENT

SCARBRO ENVIRONMENTAL LTD

PROJECT

362 JONES RD, HUNUA

TITLE

PROPOSED SOUTHERN UNDERFILL STRIP DRAIN



Fraser Thomas

ENGINEERS • RESOURCE MANAGERS • SURVEYORS

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SCALE 1:1500 (A3)

DRAWING No 33250/351 REVISION A

About Boffa Miskell

Boffa Miskell is a leading New Zealand professional services consultancy with offices in Whangarei, Auckland, Hamilton, Tauranga, Wellington, Nelson, 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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