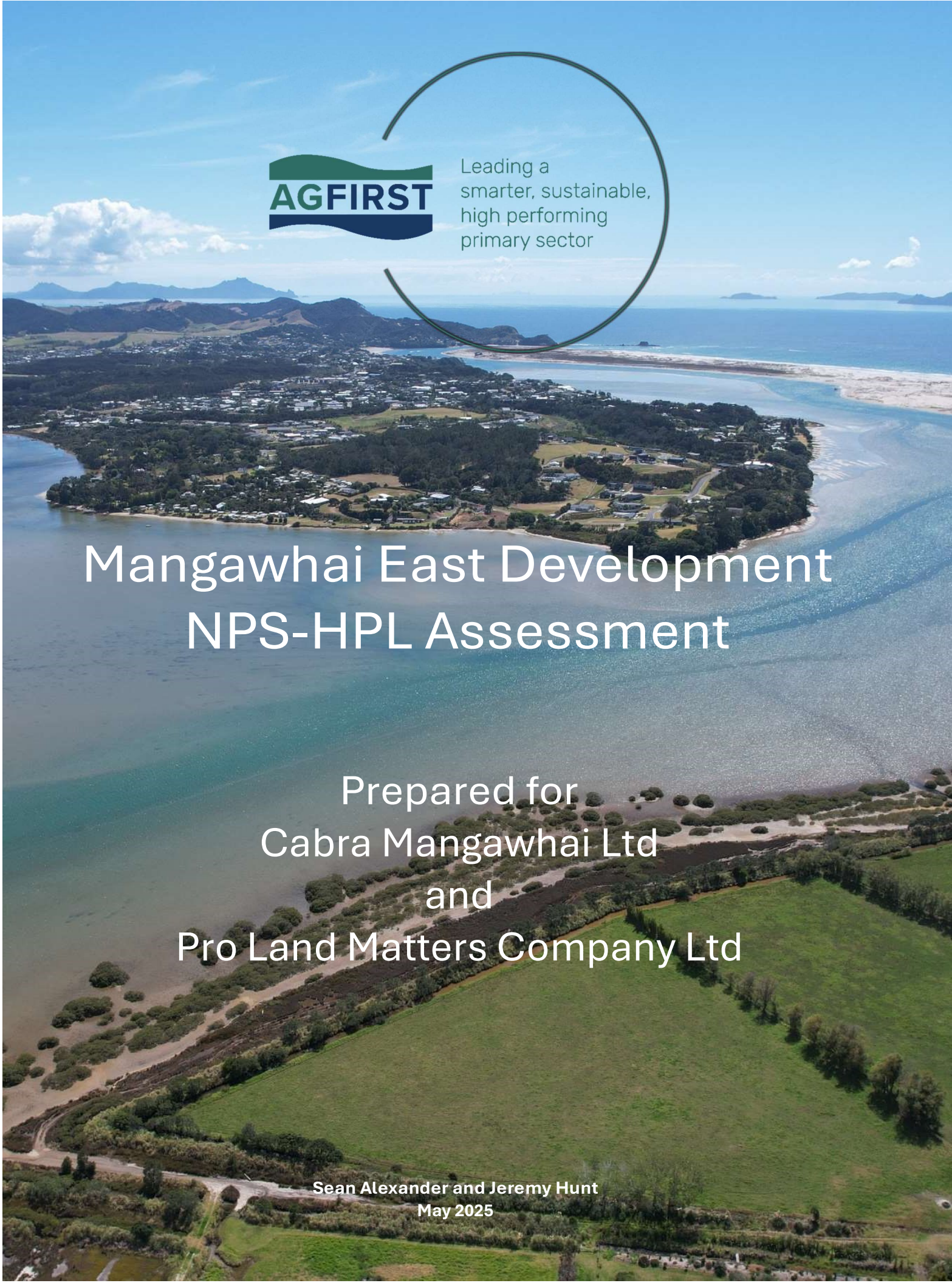

Mangawhai East Development NPS-HPL Assessment

Prepared for
Cabra Mangawhai Ltd
and
Pro Land Matters Company Ltd

Sean Alexander and Jeremy Hunt
May 2025

Document Quality Assurance

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1.0 Executive Summary

Cabra Mangawhai Limited and Pro Land Matters Company Limited (**The Applicant**) is seeking a Plan Change (**PPC**) for an area of land to the southeast of Mangawhai Village on the southern side of Mangawhai Harbour with the land bordering Black Swamp Road and Raymond Bull Road. The PPC area encompasses approximately 94 hectares with multiple landowners. The land is currently zoned Rural under the Operative Kaipara District Plan 2013.

As part of the PPC, the applicant wishes to rezone twenty-four properties, with a combined area of 80.15 ha into a mix of residential and commercial zoned land (**Subject Site**), as has been indicated in the Mangawhai Spatial Plan December 2020.

The PPC also seeks to rezone land identified as Highly Productive Land for Rural Lifestyle zoning utilising the Clause 3.7 and 3.10 pathway. AgFirst have prepared a separate report assessing the proposed Rural Lifestyle zoning.

AgFirst Waikato (2016) Ltd has assessed the PPC Site against the National Policy Statement – Highly Productive Land (**NPS-HPL**). This relates to an assessment of the Subject Site against the circumstances in which the rezoning may be undertaken as set out in the NPS-HPL.

The Subject Site consists of nineteen small residential lifestyle properties between 0.08 – 2.97 ha, a holiday park, two larger lifestyle blocks (0.35 and 7.22 ha) and two larger Rural Lots (19.80 and 30.92 ha). During the site visit, there were two productive systems identified across the larger parcels, being first time arable cropping operation and drystock farming. There are currently no land-based primary production activities operating on the smaller lifestyle blocks, developed areas, and residential sections. These areas are not contributing to the overall productivity of the Subject Site and have been identified as unproductive due to the modified and anthropic soils.

Under the New Zealand Land Resource Inventory (NZLRI), the majority of the Subject Site is classified as HPL (Land Use Capability (LUC) 1 – 3). However, The NZLRI LUC does not take into account unproductive and modified areas, such as lifestyle blocks, curtilage, driveways and lanes. The property has had a detailed site-specific soil map prepared, which identifies the presence of the soil constraints, and allows for a more granular scale to identify areas specific to smaller properties (rather than a regional scale). The mapping identifies 42.37 ha of LUC 3 (a combination of wetness (w), soil (s) and erosion (e) limitation), 24.96 ha or LUC 4 + and 12.81 ha of non-effective land. Therefore, the Subject Site has limitations that restrict the productive capacity of the land with regards to future land use potential.

The key limitations for land-based primary production and versatility on the Subject Site are:

- Non-reversable land fragmentation
- Lack of contiguous areas of HPL soils
- Poor draining soils across the majority of the Subject Site (particularly on the flat areas)
- Inability to consolidate the land to form any productive scale with neighbouring land.

In order to meet the requirements of the NPS-HPL, AgFirst has assessed alternative options for expansion of urban land in Mangawhai to meet growth requirements. These areas have been identified by economists, as required by Clause 3.6 to achieve sufficient development capacity. This includes consideration of whether the alternative options would result in the loss of soils and HPL that has a relatively lower productive capacity than the Subject Site. Given the constraints identified, AgFirst believes that the re-zoning of the Subject Site meets the requirements of the NPS-HPL Clause 3.6(4)(b), where other alternative expansion sites have greater productive capacity and a greater proportion of HPL. There are no other reasonably practicable and feasible options that would result in greater protection of HPL for land-based primary production.

AgFirst has also assessed the costs of allowing the proposed urban rezoning from Rural to urban in terms of the loss of HPL for land-based primary production to inform the assessment that is required under Clause 3.6(4)(c) of the NPS-HPL. The productive nature of the Subject Site is already significantly compromised due to the historical non-reversable land fragmentation (subdivisions and lifestyle blocks) which have occurred extensively over the past ten years. AgFirst does not consider that the loss of the well below average productivity from the Subject Site will have a significant loss on the district's production, and the conversion of the land into urban would not cause any fragmentation or further disruption of additional HPL.

2.0 Background and Property Description

Cabra Mangawhai Limited and Pro Land Matters Company Limited (**The Applicant**) is seeking a Plan Change (**PPC**) for an area of land to the southeast of Mangawhai Village on the southern side of Mangawhai Harbour with the land bordering Black Swamp Road and Raymond Bull Road. The PPC area encompasses approximately 94 hectares with multiple landowners. This is located within the Rural Zone under the Kaipara District Council. The PPC location in relation to other land use zones and the Mangawhai township is presented in Figure 1.

The PPC request seeks to re-zone 94 hectares (approx.) of rural zoned land, within the Mangawhai Harbour overlay to a mix of residential and commercial zoned land:

(i) Rural Lifestyle zone
(ii) Large Lot Residential zone
(iii) Low Density Residential zone
(iv) Medium Density Residential zone
(v) Neighbourhood Centre zone
(vi) Mixed Use zone.

The purpose of the PPC is to:

- Provide additional urban zoned land as a natural extension of Mangawhai Village, for residential and supporting business activities,
- Support the growth of Mangawhai and ensure that there is sufficient land supply to provide choices and maintain affordability.
- Provide a coordinated and efficient use of the land resource for the Mangawhai East area where there are urban activities and extensive rural residential living activities establishing in an ad hoc manner.

Presented in Figure 2 is the proposed plan of the PPC area.

As part of the PPC, the applicant wishes to rezone twenty-four of the properties, with a combined area of 80.15 ha into mixture of residential and commercial zone (**Subject Site**). Adjoining sites and areas include a drystock operation to the north, lifestyle properties to the east and south and the Mangawhai Harbour to the west. The Subject Site is currently utilised as a mix of lifestyle operations, drystock farming and some recently rotational maize cropping.

The soils mapped at the Subject Site are classified under the New Zealand Land Resource Inventory (**NZLRI**) as Land Use Classification (**LUC**) 3w14, 3s14 and 4e9. Land that is zoned rural and LUC 1-3 qualifies as Highly Productive Land (**HPL**) and is subject to the National Policy Statement for Highly Productive Land (**NPS-HPL**).

AgFirst Waikato (2016) Ltd (**AgFirst**) has been engaged by the applicant to provide an assessment of the Subject Site against the NPS-HPL. This relates to an assessment on whether it is considered it meets the exemptions set out in Section 3.6 of the NPS-HPL. Clause 3.6 of the NPS-HPL allows for urban rezoning (ii) – (vi) above.

AgFirst is a suitably qualified agribusiness consultancy that has a wealth of experience in assessments relating to productive capacity, primary production and soil versatility. AgFirst visited the property on the 14th of March 2025.

In order to meet the requirements of the NPS-HPL, AgFirst has assessed alternative options for expansion of urban land in Mangawhai to meet growth requirements. This report should be read in conjunction with other expert reports on this matter, including the planning and economic analyses. AgFirst has also assessed the costs of allowing the proposed rezoning from rural to urban in terms of the loss of HPL for land-based primary production. These assessments are relevant considerations under Clause 3.6(4)(b) and (c) of the NPS-HPL. Clause 3.6 of the NPS-HPL does not allow for rezoning for rural lifestyle (i) above, this area within the PPC has been assessed separately against Clause 3.10.

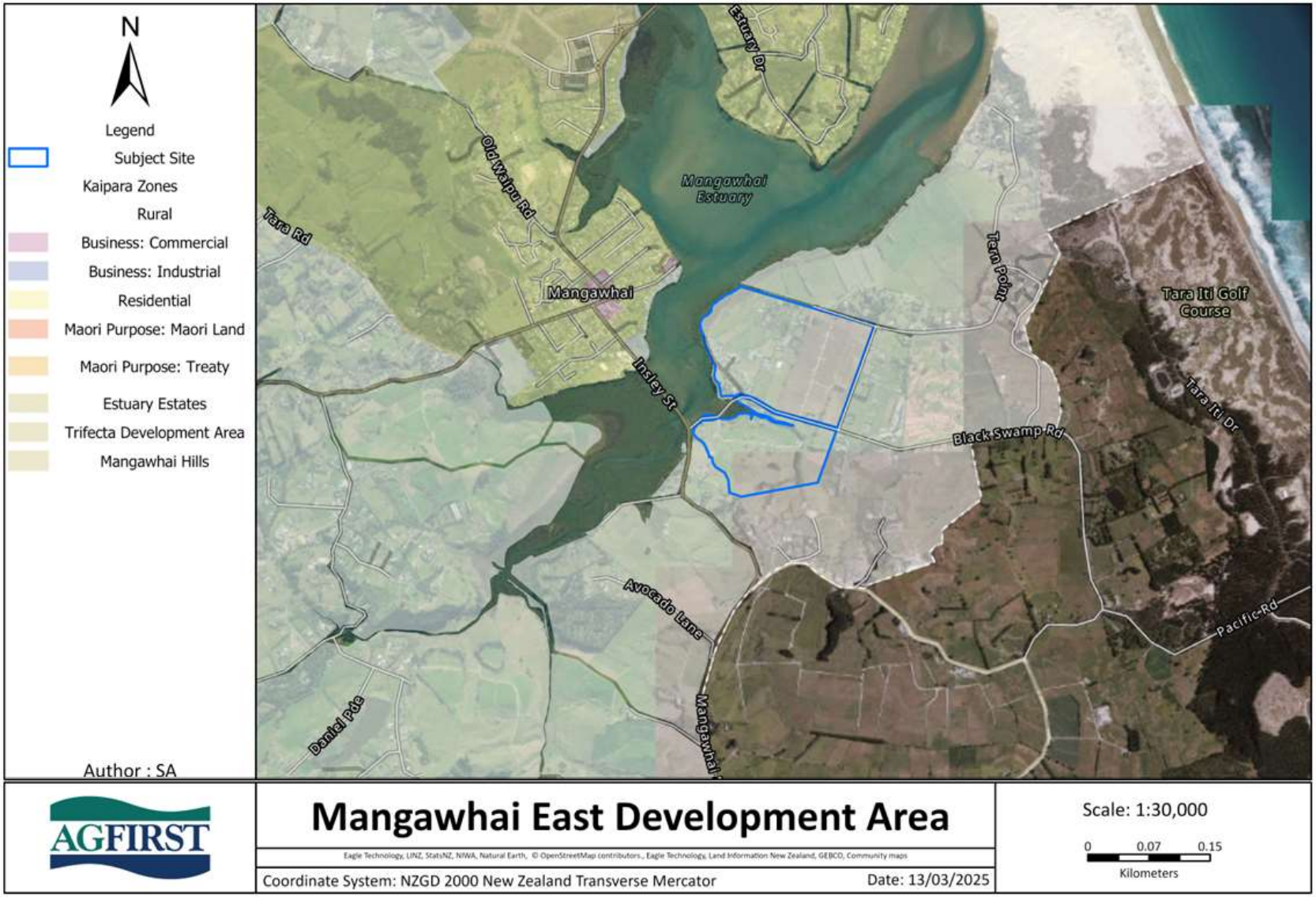

Figure 1: PPC area and District Planning Zones

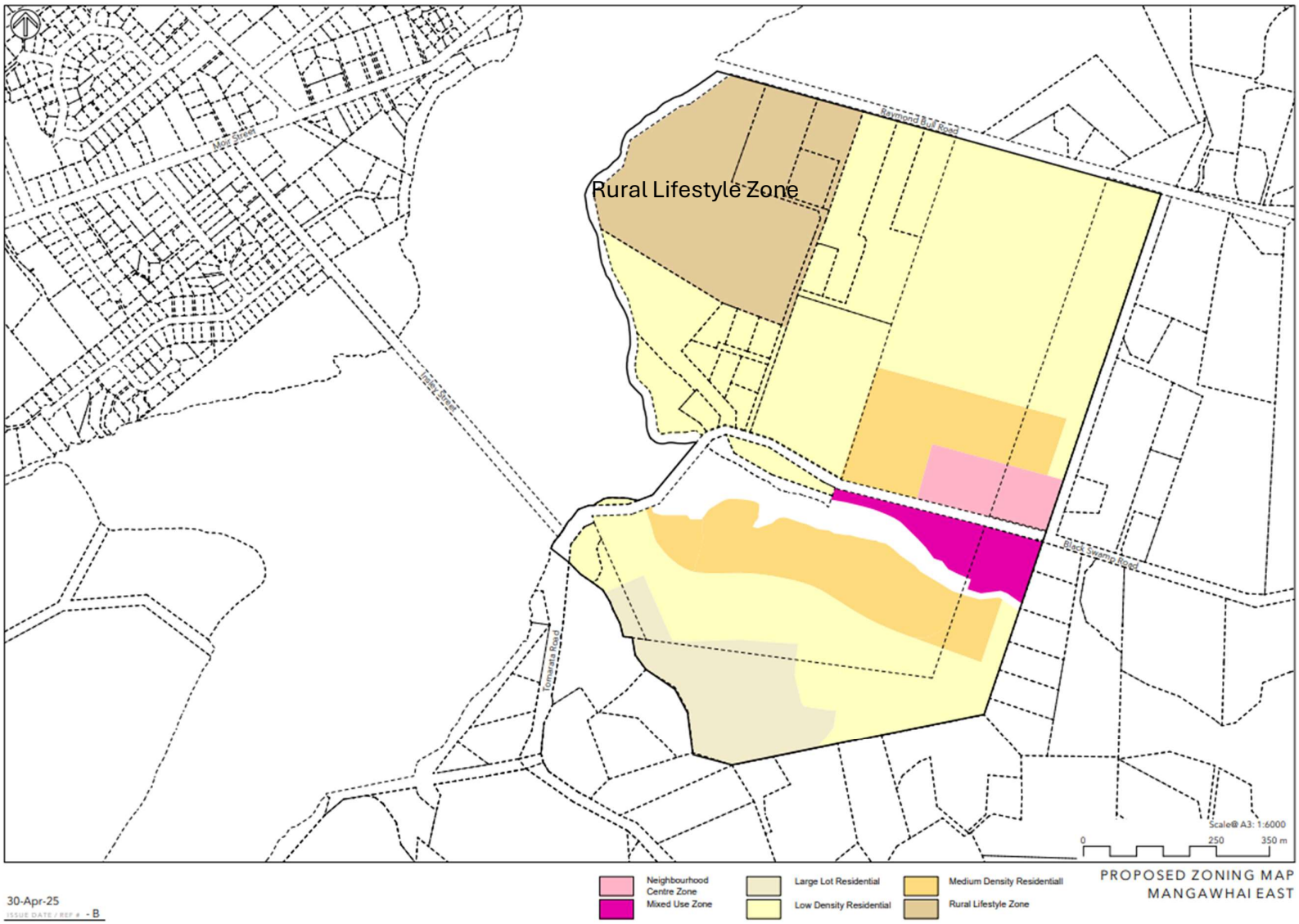

Figure 2: Proposed Plan of the PPC area

2.1 Site Description

The Subject Site consists of twenty-four rural zoned properties, with a combined area of 80.15 ha. The properties consists of nineteen small residential lifestyle properties between 0.08 – 2.97 ha, a holiday park, two larger lifestyle blocks (0.35 and 7.22 ha) and two larger Rural Lots (19.80 and 30.92 ha). These details are summarised in Table 1. The location of these individual titles in relation to the Subject Site is shown in Figure 3.

The Subject Site is located across the harbour from Mangawhai township. Adjoining the Subject Site to the south and east are additional lifestyle properties, the Mangawhai Harbour to the west, and a drystock farm to the north. All of the surrounding areas are zoned Rural.

Table 1. Description of Parcels within Subject Site

Zone	Map #	Parcel / Lot	Area (ha)
GRZ	1	Lot 3 Deposited Plan 29903	0.08
	2	Lot 7 Deposited Plan 565865	0.30
	3	Lot 1 Deposited Plan 565865	0.30
	4	Lot 2 Deposited Plan 565865	0.30
	5	Lot 3 Deposited Plan 565865	0.30
	6	Lot 1 Deposited Plan 83638	0.30
	7	Lot 6 Deposited Plan 565865	0.31
	8	Lot 5 Deposited Plan 565865	0.38
	9	Lot 1 Deposited Plan 560798	0.40
	10	Lot 4 Deposited Plan 565865	0.42
	11	Lot 1 Deposited Plan 392239	0.46
	12	Lot 1 Deposited Plan 177202	0.52
	13	Lot 2 Deposited Plan 392239	0.59
	14	Lot 2 Deposited Plan 177202	0.69
	17	Lot 2 Deposited Plan 83638	1.05
	18	Lot 1 Deposited Plan 74423	1.11
	19	Lot 1 Deposited Plan 33798	1.21
	20	Lot 2 Deposited Plan 560798	2.27
	22	Lot 3 Deposited Plan 560798	2.86
	23	Lot 1 Deposited Plan 84426	2.97
	24	Lot 3 Deposited Plan 177202	5.38
	25	Section 3 Block IV Mangawhai Survey District	7.22
	27	Lot 1 Deposited Plan 29903	19.80
	28	SEC 25 BLK IV Mangawhai SD & Lot 2 Deposited Plan 29903	30.92
	Total		80.15

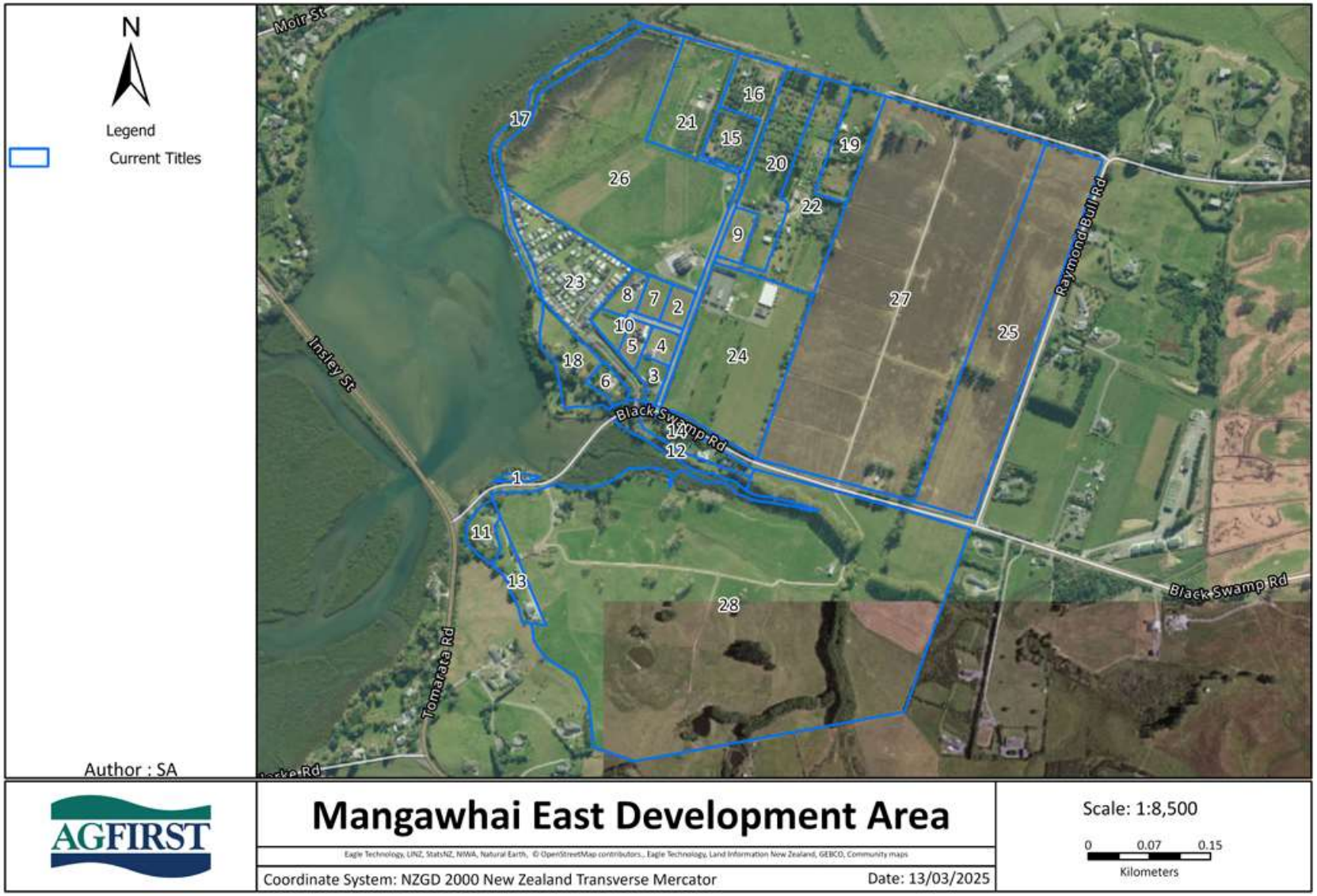

Figure 3: Current titles of Development Site

2.2 Current Land Use

The Subject Site consists of 80.15 ha of Rural zoned land and includes twenty-four different properties. Due to the majority of these properties being lifestyle or large lot residential in size and character, there is a large area across the Subject Site that is not available for productive purposes. This has been mapped as 12.81 ha, with the balance area of 67.33 ha being potentially available for land-based primary production.

There are currently no land-based primary production activities operating on the smaller lifestyle blocks, developed areas, and residential sections. These areas are not contributing to the overall productivity of the Subject Site and have been identified as unproductive due to the modified and anthropic soils. Anthropic soils, or human-made soils, are soils that have been significantly modified or created by human activities. Despite this, for the economic analysis required in the 3.6 assessment a holistic approach must be applied, these areas have been identified as being productive despite the low/lack of productive capacity. It is important to note that some of the lifestyle blocks have considerable residential housing improvements established on these sites making it less likely to be used in the long-term for land-based primary production. Non-reversable fragmentation also restricts the use of these areas to be used at any reasonable scale.

During the site visit, there were two productive systems identified across the larger parcels, being a first time arable cropping operation and drystock farming.

The arable cropping was estimated as being approximately 25.91 ha within properties 25 and 27 (Figure 2). Whilst this was currently in maize grain (Pioneer P0640), this is not a continuous arable cropping block, with the 2024/2025 season being the first year in arable land use. This has previously been used as a drystock farm. These soils have been mapped at a paddock scale as being Ruakaka peaty sandy loam, which are poorly drained. Wetness is the major limiting factor for production on the majority of this area. High water tables and poor drainage result in crop choices limited to annual crops and those that can tolerate wet soil conditions. Care needs to be taken when utilising these soils as over cultivation can cause a loss of soil carbon and soil structure and result in shrinkage and soil structure degradation.

The drystock operations were limited to two properties on either side of Swamp Road (property 28 and 24), with an estimated 28.63 ha and 4.69 ha of effective grazing land available (total 33.33 ha). The blocks are extensively run, as expected for small scale drystock farms and lifestyle block. There are stock yards and a loading ramp on the larger block with stock drinking water reticulated to each paddock. The small lifestyle grazing block has no infrastructure.

3.0 Regulatory Framework

3.1 National Policy Statement for Highly Productive Land

In September 2022, the Ministry for the Environment (**MfE**) and the Ministry for Primary Industries (**MPI**) released the NPS-HPL. The objective of the NPS-HPL is "*Highly productive land is protected for use in land-based primary production, both now and for future generations*."

Land-based primary production means "*production, from agricultural, pastoral, horticultural, or forestry activities, that is reliant on the soil resource of the land"*.

Productive capacity, in relation to land, means "*the ability of the land to support land-based primary production over the long term, based on an assessment of:*

a. *physical characteristics (such as soil type, properties, and versatility); and*
b. *legal constraints (such as consent notices, local authority covenants, and easements); and*
c. *the size and shape of existing and proposed land parcels"*.

Land which is zoned rural and which is LUC 1, 2 and 3 must be treated as HPL under Clause 3.5(7) of the NPS-HPL prior to regional mapping of HPL being undertaken, unless the land was identified for future urban development or was subject to a Council initiated or adopted plan change at the commencement date of the NPS-HPL. Those exclusions do not apply for the PPC site.

LUC, 1, 2, or 3 land means *"land identified as Land Use Capability Class 1, 2, or 3, as mapped by the New Zealand Land Resource Inventory (NZLRI) or by any more detailed mapping that uses the Land Use Capability classification"*.

Policy 5 of the NPS-HPL has relevance and reads: "*The urban rezoning of highly productive land is avoided, except as provided in this National Policy Statement"*. Clause 3.6(4) is the relevant clause as it provides that territorial authorities that are not Tier 1 or 2 (KDC is Tier 3) may allow urban rezoning of highly productive land only in accordance with the matters contained within it. Clause 3.6(5) is also relevant. Those clauses are detailed below:

d. *Territorial authorities that are not Tier 1 or 2 may allow urban rezoning of highly productive land only if:*
    a) *the urban zoning is required to provide sufficient development capacity to meet expected demand for housing or business land in the district; and*
    b) *there are no other reasonably practicable and feasible options for providing the required development capacity; and*
    c) *the environmental, social, cultural and economic benefits of rezoning outweigh the environmental, social, cultural and economic costs associated with the loss of highly productive land for land-based primary production, taking into account both tangible and intangible values.*
e. *Territorial authorities must take measures to ensure that the spatial extent of any urban zone covering highly productive land is the minimum necessary to provide the required development capacity while achieving a well-functioning urban environment.*

AgFirst will address (in part) Clause 3.6(4)(b) in this report by assessing the productive capacity of the Subject Site and comparing this with additional localities surrounding Mangawhai that would be deemed to be 'other reasonably practicable and feasible options'. AgFirst will also address (in part) Clause 3.6(4)(c) in relation to the costs of allowing the proposed urban rezoning of the Subject Site from Rural to urban in terms of the loss of HPL for land-based primary production.

3.2 Highly Productive Land

The NPS-HPL sets out a prescriptive approach for councils to identify and protect highly productive land. Until councils have given effect to the NPS-HPL, the interim is provided under Clause 3.5(7):

(7) Until a regional policy statement containing maps of highly productive land in the region is operative, each relevant territorial authority and consent authority must apply this National Policy Statement as if references to highly productive land were references to land that, at the commencement date:

(a) Is:

(i) Zoned general rural or rural production; and

(ii) LUC 1, 2, or 3 land; but

(b) Is not:

(i) Identified for future urban development; or

(ii) Subject to a Council initiated, or adopted, notified plan change to rezone it from general rural production to urban or Country Living Zone.

LUC 1, 2, or 3 land is defined as LUC Classification 1, 2, or 3, as mapped by the NZLRI or by any more detailed mapping that uses the LUC classification.

4.0 Land and Soil Assessment

Determining the presence of high-quality soils and HPL, as defined under the LUC classification, requires consideration of a range of characteristics, in accordance with the methods described in the third edition of the LUC Survey Handbook to assess the suitability of the land for primary production. These include such characteristics as erosion, susceptibility to flooding, wetness, land aspect and topography. Therefore, this assessment has taken the following steps to identify soils present within the Subject Site:

- Desktop assessment of LUC from the NZLRI portal
- The S-Maps are not available for this region therefore soil information has been sourced from the Northland Regional Council, which include various soil surveys that were compiled in 1980 by J.E Fox.
- Contours derived from the LINZ, LIDAR database
- Site specific soil surveys

AgFirst has assessed the productive use of the subject land, taking into account a range of characteristics. These were determined by the site visit and soil expert Ian Hanmore's soil resource report, which are relevant to the productive potential including:

- Soil characteristics
- Drainage
- Potential for sensitivity constraints from surrounding development and land use
- Economic limitations arising from small, fragmented portions of land and its productive potential

This Section presents the results and outcomes from the desktop information and site-specific soil and LUC assessment.

4.1 Land Use Capability Classification

The LUC classification system has been used in New Zealand to help achieve sustainable land development and management of farms. The purpose of the LUC classification is to assess the suitability of the land for primary production. Determining the presence of HPL as defined under the LUC classification requires consideration of a range of characteristics. The LUC classification categorises land areas or polygons into classes, subclasses, and units according to the land's capability to sustain productive use. The LUC is based on an assessment of the physical factors (rock type, soil, slope, present type and severity of erosion, and vegetation), climate, the effects of past land use, and the potential for erosion. This is summarised in Figure 4 below.

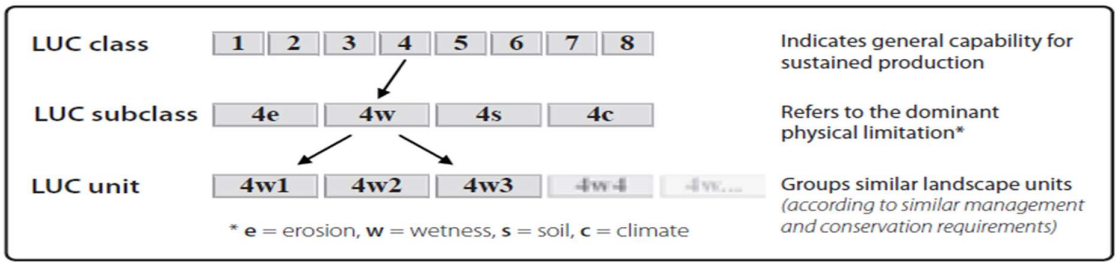

Figure 4: Components of the land use capability classification[1]

AgFirst has reviewed the NZLRI national database of physical land resource information for the Subject Site. This database is based on a regional scale LUC rating of the ability of each polygon to sustain agricultural production.

The NZLRI maps are designed for use at a 1:63,000 and are suitable for guidance, but are not specially designed to be interpreted at a farm or paddock scale. This means 1 cm^2 of published map covers 36.69 ha. Following the observation guidelines this equates to, at most, one observation per 36.69 ha and at the least one observation per 146.76 ha. Therefore, the NZLRI maps should only be treated as an indicator for LUC at the site. The observation guidelines are in reference to one observation site per 1 cm^2 of published map, with a minimum acceptable limit of one site per 4 cm^2 of published map according to New Zealand soil mapping protocols and guidelines (Grealish 2019).

The soils mapped at the property are classified under the NZLRI as LUC 3w14, 3s14 and LUC 4e9. Therefore, based on the NZLRI, the majority of the Subject Site is HPL (LUC 1, 2 or 3). The NZLRI LUC classifications for this area are presented in Figure 5.

[1] Lynn, I.H, Manderson, A.K, Page, M.J, Harmsworth, G.R, Eyles, G.O, Douglas, G.B, Mackay, A.D, Newsome, P.J.F. (2009). Land Use Capability Survey Handbook – a New Zealand handbook for the classification of land 3rd ed. Hamilton, AgResearch; Lincoln, Landcare Research; Lower Hutt, New Zealand. GNS Science.

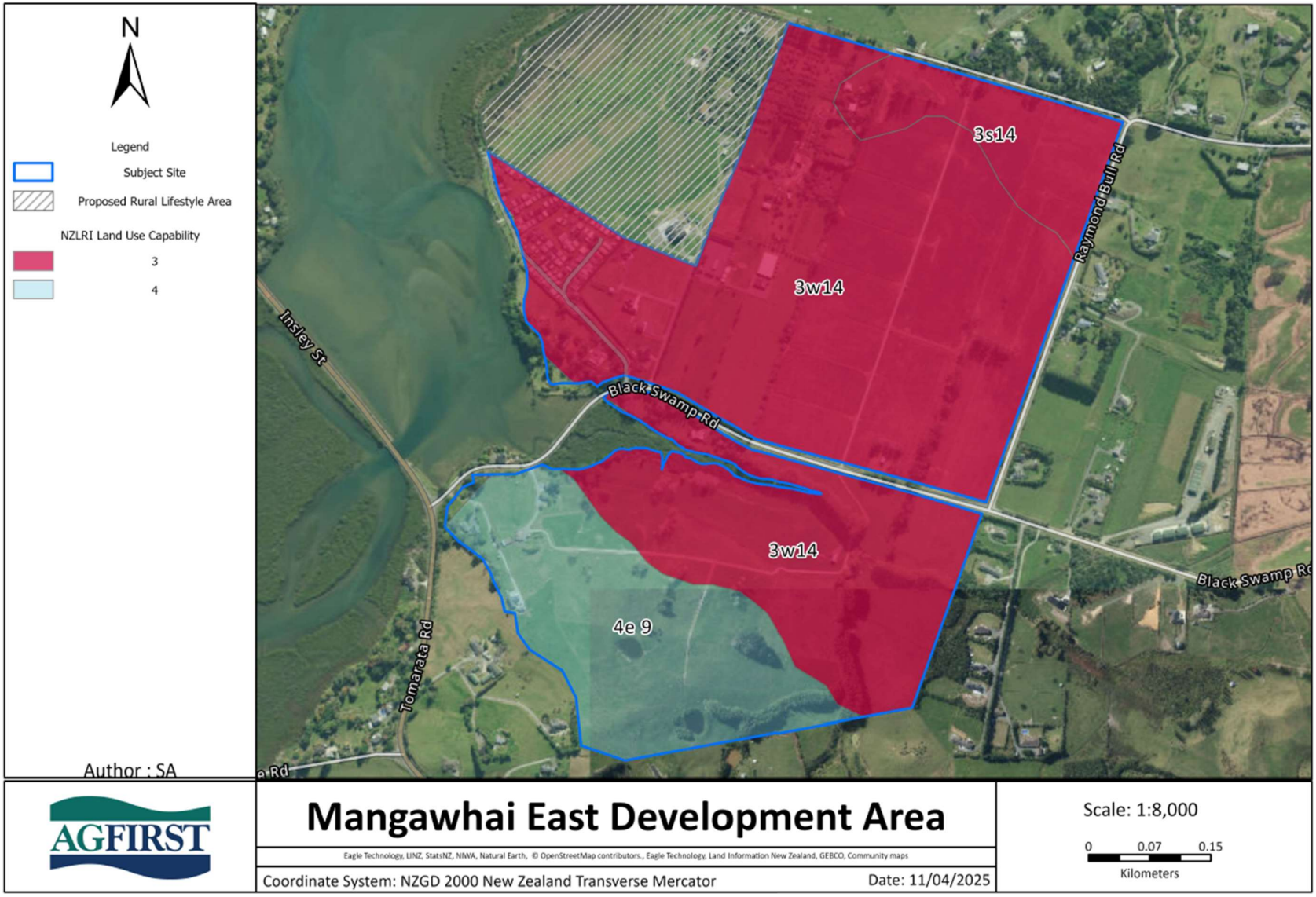

Figure 5: NZLRI Land Use Capability Classification Map for the Subject Site

4.2 Site Specific Mapping and LUC Assessment

The NZLRI LUC maps are not intended for farm scale interpretation. Therefore, soil expert Ian Hanmore, Hanmore Land Management (HLM) has been engaged by the applicant to undertake an assessment and review the LUC and soils of the Subject Site. This section presents the results and outcomes from this report. This report is provided in Annexure A: Addendum Report for the Cabra Soil and Resource Report, Mangawhai.

Key observations from these reports identify the following:

- The LUC assessment has been undertaken in accordance with accepted guidelines (Milne et al., 1995, and Lynn et al., 2009).
- The areas of LUC class 3 land across the Subject Site is smaller than those mapped by the NZLRI.
- The HLM report found that a total of 55.6 ha of land was LUC class 3 with the balance comprised of LUC units 4e 5, 4e12, 4w 3, 4s 4, 6w 1, 6w 2, 7w 1, developed areas and estuarine margins that could not be used productivity.
- The HLM report found that the area of LUC class 3 land on the northern side of Black Swamp Road formed one large area but was fragmented by legal titles which range in size from 0.3 ha to 19.8 ha
- The arable operations (Properties 25 & 27) are mostly mapped as LUC 3w4, with the soils being a Ruakaka peaty sandy loam + Ruakaka loamy peat. This is a poorly drained soil with wetness limitations.
- The small pastoral livestock grazing block (property 24) is mostly mapped as LUC 3w4, a One Tree Point peaty sand + Ruakaka peaty sandy loam. This is a poorly drained to well-drained soil, with an overall wetness limitation.
- LUC 3 land has moderate limitations to arable use which restrict the choice of crops that can be grown and the intensity of cultivation.
- Wetness is the major limiting factor for production on the majority of this area. High water tables and poor drainage result in crop choices limited to annual crops and those that can tolerate wet soil conditions. Care needs to be taken when utilising these soils as over cultivation can cause a loss of soil carbon and soil structure and result in soil shrinkage and soil structure degradation.
- Property 28 to the south of Black Swamp Road makes up most of the drystock farming for the Subject Site. This area contains a mosaic of different soils, but very few are LUC 1-3.
- Class 4 land has severe physical limitations to arable use that substantially reduce the range of crops that can be grown and make intensive soil conservation and management necessary with only occasional cropping possible.

The revised HPL areas, LUC class and soil classifications are shown in Figures 6, 7 and 8.

The soil expert concluded that “The most productive area of the site includes the peat and peaty sand flats represented by the LUC units 3w4 and 3e5. There are constraints to the use of the land due to fragmentation from the number of legal titles in the proposed area as well as the proximity to neighbours.”

The observations made by AgFirst during the site visit are consistent with the observations made from Ian Hanmore.

In addition to the soil maps, the slope map generated by the LINZ database of 1m LiDAR portrays the slope within the Site. This is presented in Figure 9, with the majority of the slopes being flat with some gently undulating, with rolling and strongly rolling to the south of Black Swamp Road.

An overlay of the unproductive areas in presented in Figure 10 for the Subject Site. This includes dwellings, impervious surfaces, sheds, driveways and curtilage.

Figure 6: HPL areas mapped at property scale by HLM for the Subject Site (green = HPL / brown = non-HPL)

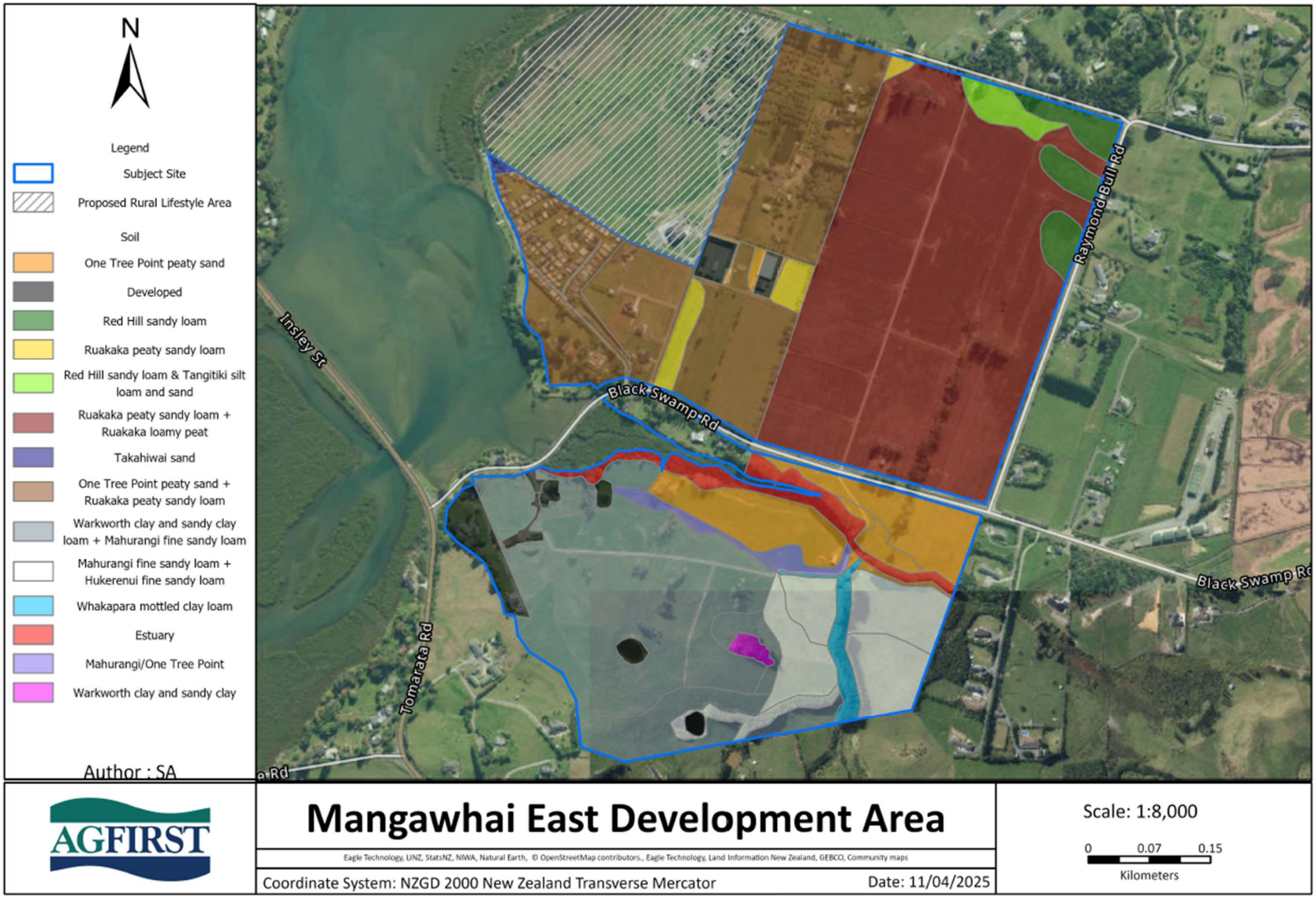

Figure 7: LUC classes mapped at property scale by HLM for the Subject Site

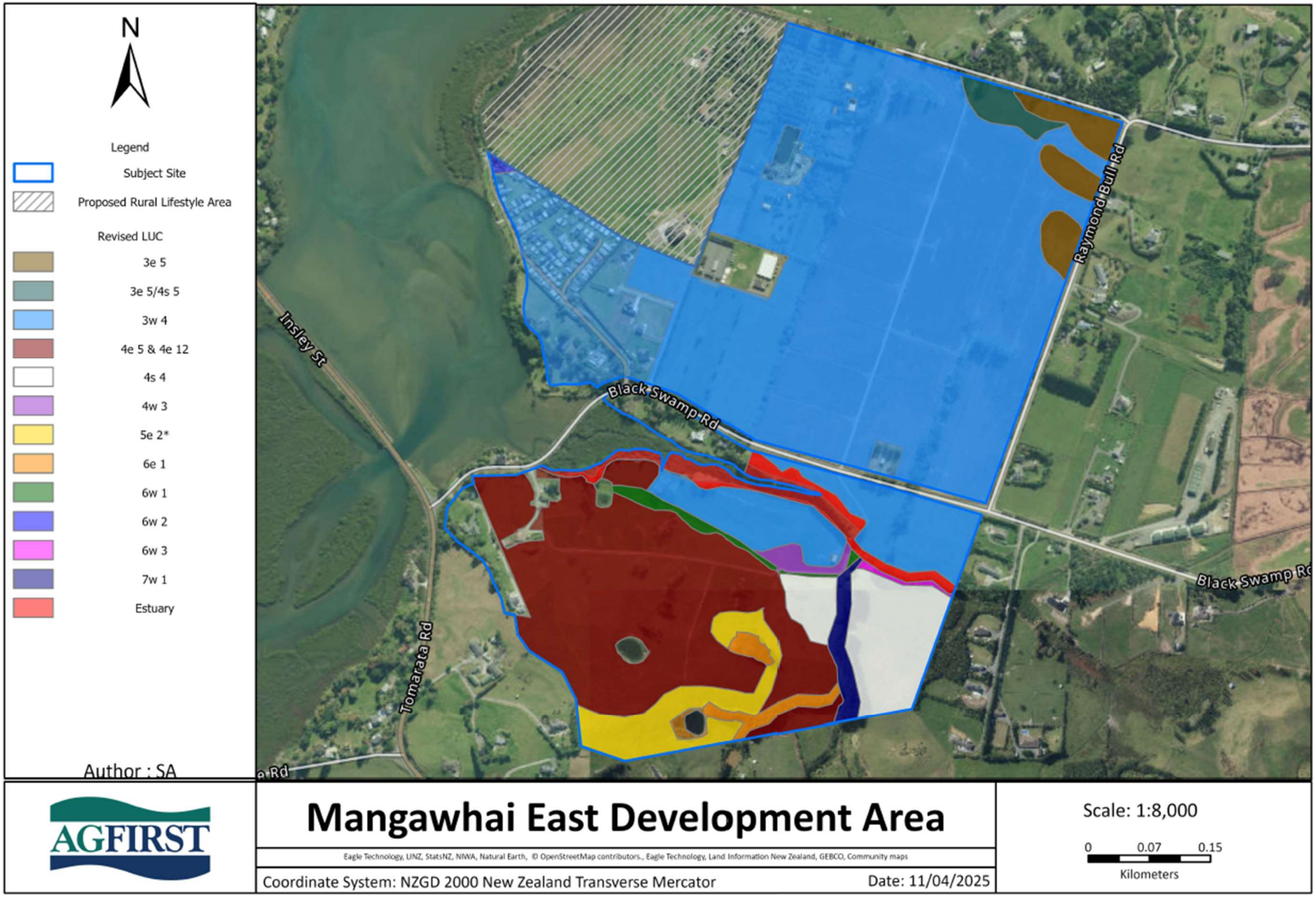

Figure 8: Soil Classification mapped at property scale by HLM for the Subject Site.

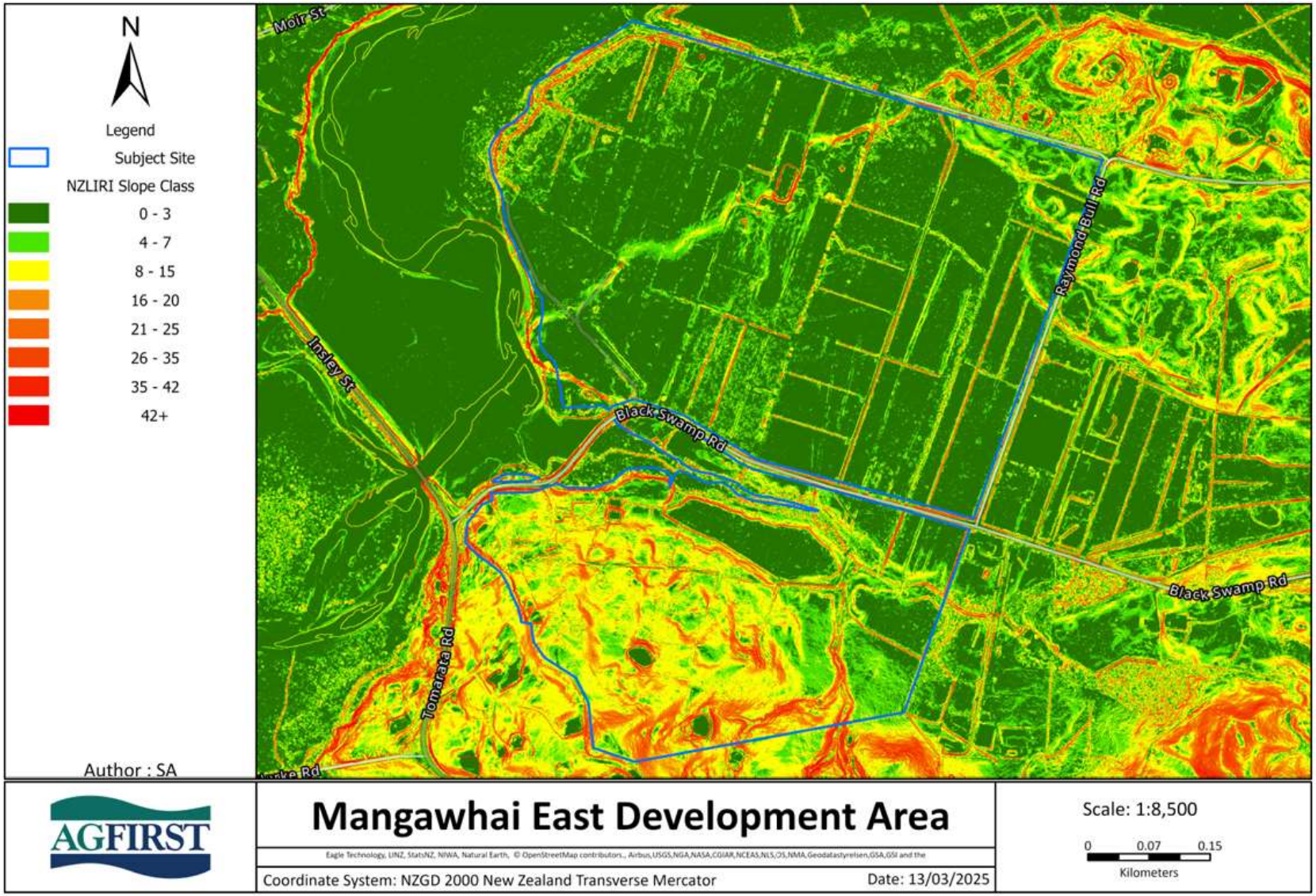

Figure 9: Slope map of the Subject Site

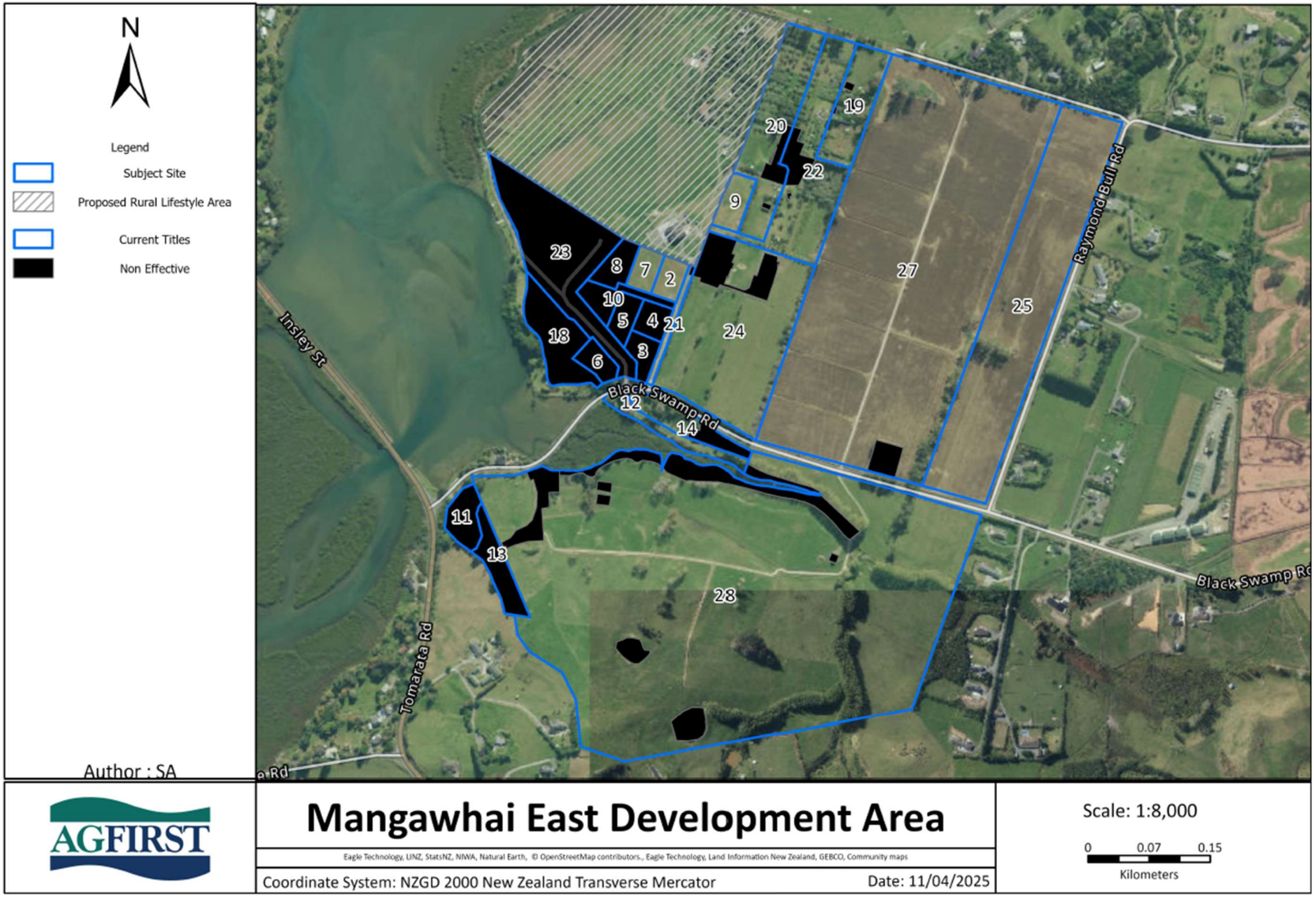

Figure 10: Ineffective and non-productive areas within the Subject Site

4.3 Land Use Capability - Summary

Having undertaken a site visit, to determine the presence of soils at the Subject Site, in addition to other contributing factors such as residential areas, modified and anthropic soils, slope and areas occupied by streams and bush, it is considered that the area of HPL is much smaller than represented by the NZLRI maps. Based on site specific mapping as discussed in section 4.2, it is estimated that the area that is HPL is approximately 42.37 ha, with 37.77 ha being non-HPL (Non-Effective or LUC 4-8).

As Figure 10 demonstrates, the Subject Site is significantly fragmented, with extensive rural lifestyle-sized lots and non-HPL areas preventing any large contiguous areas from being consolidated (through boundary adjustments or amalgamation) to enable it to be viable for productive use. This compounded with low productivity and high land value and rates associated with these properties mean economic viability is not possible.

Presented in Table 2 is the HPL as mapped by the NZLRI and the revised classification area.

Table 2: HPL areas within the Site

	NZLRI Classification area (ha)	Revised Classification area (ha)
HPL	64.35	42.37
Non-HPL (LUC 4+)	15.80	24.96
Non-Effective	0.00	12.81
Total Site	80.15	80.15

Enabling urban rezoning, as sought by the applicant, on the land which is not identified as HPL (Non-Effective and LUC 4+), is not subject to the NPS-HPL regulations. This is further supported by the fact that this area of non-HPL is not part of any other contiguous area of HPL, therefore a holistic approach is not justified.

5.0 Land Use Potential

The Subject Site consists of a combined area of 80.15 ha including 24 properties, ranging from 0.08 ha to 30.92 ha. The feasibility of forming a viable size productive unit by amalgamating these properties is not a reasonably practicable option due to the limited opportunity for land-based primary production. It is also important to note that some of the lifestyle blocks have considerable residential housing improvements, making it less likely to be used in the long-term for land-based primary production. This is amplified, with most of the surrounding properties also being utilised for lifestyle purposes and roads.

The Subject Site has been mapped by HLM, with approximately 42.37 ha that is LUC 3 (HPL). There is 24.96 ha of additional area of productive land (LUC 4-6), with approximately 12.81 ha that is identified as being non-effective. The individual property information is detailed in Table 3.

While located within the Rural zone, the small lifestyle properties and developed areas are not used for land-based primary production and would not be suitable for productive use or commercial use beyond a small number of beef cattle or sheep grazing.

Table 3: Areas available for productive use across the Subject Site

Map #	Area (ha)	Non-Productive	Productive	
		Non-Effective	HPL Area	Non-HPL Area
1	0.08	0.08	0	-
2	0.30	-	0.30	-
3	0.30	0.30	0	-
4	0.30	0.30	0	-
5	0.30	0.30	0	-
6	0.30	0.30	0	-
7	0.31	-	0.31	-
8	0.38	0.38	0	-
9	0.40	-	0.40	-
10	0.42	0.42	0	-
11	0.46	0.46	0	-
12	0.52	0.52	0	-
13	0.59	0.59	0	-
14	0.69	0.24	0	0.45
17	1.05	1.05	0	-
18	1.11	1.11	0	-
19	1.21	0.05	1.16	-
20	2.27	0.22	2.05	-
22	2.86	0.29	2.57	-
23	2.97	2.97	0	-
24	5.38	0.69	4.69	-
25	7.22	-	7.22	-
27	19.80	0.25	18.69	0.86
28	30.92	2.29	4.98	23.65
Total	**80.15**	**12.81**	**42.37**	**24.96**

The Subject Site is currently used for two production types. As discussed in Section 2.2, arable cropping is currently undertaken on approximately 25.91 ha (the HPL areas within property 25 and 27). AgFirst does not consider that this area is suitable for a long-term and continuous arable cropping regime, due to the soil limitations and long-term sustainability regarding cultivation. The only other areas that are currently used for land-based primary production is property 24 and property 28. This includes drystock farming across approximately 33.33 ha, being the total effective areas (HPL and Non-HPL).

The key limitations for land-based primary production and versatility on the Subject Site are:

- Wetness limitations and high-water table
- Significant fragmentation of lifestyle blocks and residential areas within the Subject Site
- Saline Soils on the Mangawhai Harbour boundary.
- Coastal inundation on the Mangawhai Harbour Boundary.
- The Subject Site is dissected by Black Swamp Road
- Lack of size for any viable pastural operations
- Only one operational farm adjoining the Subject Site (to the north), which is a small approx. 65 ha drystock block.
- All other neighbouring land is currently subdivided into lifestyle blocks
- Adjoining area to the west is the Mangawhai Harbour

While maize was identified as growing on some properties to the north side of Black Swamp Road, it is in AgFirst opinion that this would not be sustainable as a long-term option due to the wetness limitations of the soils and high-water table. Therefore, arable use would be best used as a rotational crop, for pasture renewal purposes.

The Subject Site does not lend itself to dairy, arable, horticultural or commercial vegetable production (CVP) land uses. The wetness limitation with poor draining soils, will have an impact with some crops not surviving, while others will have reduced yields[2]. While the majority of the Subject Site is defined as HPL, which identifies it as being versatile for a range of productive uses,

Essentially, more intensive and higher land uses (such as arable, horticulture and commercial vegetable operations) require free draining (or soils without rooting barriers) and relatively flat land. The greater the wetness limitation, the more impact on yield and crop survival. Free draining and flat soils are not present across the Subject Site, therefore the versatility is vastly reduced. AgFirst does not consider that dairy, arable, horticulture or CVP is a reasonably practicable option for the Site.

Due to the above constraints, AgFirst believes that the highest and best productive use for the Subject Site is drystock grazing.

[2] Lynn, I.H, Manderson, A.K, Page, M.J, Harmsworth, G.R, Eyles, G.O, Douglas, G.B, Mackay, A.D, Newsome, P.J.F. (2009). Land Use Capability Survey Handbook – a New Zealand handbook for the classification of land 3rd ed. Hamilton, AgResearch; Lincoln, Landcare Research; Lower Hutt, New Zealand. GNS Science.

6.0 Production and Financial

The following evaluation has been based on industry information for drystock operations to demonstrate the performance (production and economic) the Subject Site.

6.1 Production Assessment

It has been established that the highest and best use for the Subject Site, given the constraints identified, would be drystock farming. The land to the north of Black Swamp Road would be challenging during the winter and following any wet weather event, due to the underlying soils being poorly drained. Operators will need to consider the pugging vulnerability for heavier stock classes.

The land to the south of Black Swamp Road, has moderately well drained to imperfectly drained soils and a steeper contour. Whilst the slope makes this area unsuitable for arable, CVP and horticulture, it is considered suitable for pastoral grazing. The key constraint is the ability to generate any economic scale. Considering the average class 5 finishing farm within the Northern North Island is approximately 255 ha, the productive areas within the Subject Site do not lend themselves to any commercial scale. Based on HLM assessment identifying stock carrying capacity for the Subject Site, the average range is 8 – 17 Revised Stock Units (RSU). While these soils have the ability to support this stocking rate in a commercial sense, AgFirst considers that this would be the upper range for the farms within the Subject Site, largely due to the small scale, lack of infrastructure and inability to defer grazing and leverage of pasture conservation.

It is unlikely that the properties will be used as a commercial farming operation, due to escalating farm working expenses, fixed costs and the location of the property in relation to Mangawhai. Continued losses or a near breakeven profitability at a farm level will not be economically sustainable, with the land likely being purchased and used as separate lifestyle or hobby farms. This block has an average land only valuation of $344,366 per ha, which is far more expensive than a commercial farm. As a comparison, a typical drystock farm with easy contour would be valued at $15,000 - $30,000 per ha. The land has been valued not on the land-based primary production or quality of the soil and land, but the location of the property for speculators and development opportunities. This is reflected with the Kaipara District council valuing the property in the same light, reflecting inflated rates and land values. With rapidly rising input costs, the returns for marginal farming operations will be reduced

The following financial review has been based on industry information for drystock farms to demonstrate the economic situation for the likely production types suited to the Subject Site. The full analysis is included in Appendix A.

6.2 Economic Baseline

The following production and financial analysis are for the productive area of the Subject Site, being 67.33 effective ha to be used as a drystock operation. This land use is considered by AgFirst as being the highest and best use of the productive area, taking into consideration all the effective land within the Subject Site. To understand the profit that an average efficient operator could generate, AgFirst has used the Beef and Lamb

New Zealand (B+LNZ) data for Northern North Island Class 5 finishing farm. This data is presented in Table 4, which includes a five year an average. The forecast Economic Farm Surplus (EFS) is estimated as being $817.55 per ha. While the Site is significantly smaller (and fragmented) than the B+LNZ survey farm (255 ha), it is a conservative comparison.

Note that this EFS is excluding the individual property rates, managerial salaries, interest on the property and assets, and any rental return. Considering that the high rates across the Subject Site, the profit from the farming business would not be viable.

Table 4: Drystock indicative budget[3]

BNS.6100	**Beef + Lamb New Zealand Economic Service**						
	Sheep and Beef Farm Survey - $ Per Hectare Analysis						
	Class 5 N.I. Finishing - Northland-Waikato-BoP						
						Provisional	
		2019-20	**2020-21**	**2021-22**	**2022-23**	**2023-24**	**5 yr average**
	Revenue Per Hectare						
1	Wool	12.3	9.22	18.24	15.62	24.84	16.04
2	Sheep	258.35	213.49	364.17	421.2	404.4	332.32
3	Cattle	1346.73	1164.28	1326.02	1133.2	952.52	1184.55
4	Dairy Grazing	84.62	116.41	118.13	117.52	150.63	117.46
5	Deer + Velvet	-0.82	-0.18	0.12	-0.05		-0.23
6	Goat + Fibre						
7	Cash Crop	420.11	419.45	395.12	260.59	346.54	368.36
8	Other	58.63	101.61	53.46	95.92	71.07	76.14
9	**Total Gross Revenue**	**2179.93**	**2024.29**	**2275.26**	**2044**	**1950**	**2094.70**
	Expenditure Per Hectare						
10	Wages	129.33	154.35	163.91	174.04	182.39	160.80
11	Animal Health	53.41	59.95	71.38	61.68	68.03	62.89
12	Weed & Pest Control	18.67	16.7	29.71	26.26	24.21	23.11
13	Shearing Expenses	14.48	16.85	17.93	28.03	34.55	22.37
14	Fertiliser	255.35	238.41	296.08	316.67	354.4	292.18
15	Lime	19	21.91	20.77	12.72	23.9	19.66
16	Seeds	56.24	88.42	63.66	50.36	50.94	61.92
17	Vehicle Expenses	52.72	51.66	58.79	53.52	54.4	54.22
18	Fuel	39.32	43.27	55.43	58.65	59.12	51.16
19	Electricity	11.7	13.91	13.83	11.61	11.95	12.60
20	Feed & Grazing	110.46	106.8	118.67	72.84	62.89	94.33
21	Dog expenses	9.36	12.45	11.01	9.25		10.52
22	Irrigation Charges						
23	Cultivation & Sowing	33.57	34.54	28.78	23.94	24.53	29.07
24	Cash Crop Expenses	35.93	50.38	30.96	15.55	16.35	29.83
25	Repairs & Maintenance	109.4	146.91	145.02	119.46	119.5	128.06
26	Cartage	31.19	41.18	42.66	46.34	47.17	41.71
27	Administration Expenses	36.65	46.61	51.06	45.56	45.6	45.10
28	**Total Working Expenses**	**1016.8**	**1144.3**	**1219.65**	**1126.47**	**1179.94**	**1137.43**
29	Insurance	23.49	25.18	27.46	27.01	28.62	26.35
30	ACC Levies	5.78	15.98	10.62	8.84	9.43	10.13
31	Rates	Included at a property economic analysis					
32	Managerial Salaries						
33	Interest	Included at a property economic analysis					
34	Rent						
35	**Total Standing Charges**	**29.27**	**41.16**	**38.08**	**35.85**	**38.05**	**36.48**
36	**Total Cash Expenditure**	**1046.07**	**1185.46**	**1257.73**	**1162.32**	**1217.99**	**1173.91**
37	Depreciation	103.18	119.46	98.59	100.57	94.34	103.23
38	**Total Farm Expenditure**	**1149.25**	**1304.92**	**1356.32**	**1262.89**	**1312.33**	**1277.14**
	Economic Farm Surplus	1030.68	719.37	918.94	781.11	637.67	817.55

[3] https://beeflambnz.com/data-tools/sheep-beef-farm-survey

The productive income for each property has been assessed at a property level. This is based on an assessment of the quality of soils and land, effective area available within each parcel and suitability for reasonably practicable land uses. The highest and best (or optimised) productive system has been identified for each property (drystock) along with the effective area available for each land use. The areas suited for productive use use has been multiplied by the gross margin, to provide an estimated income for each property.

For conservatism, lifestyle areas have been given a drystock EFS, on the assumption that a small number of sheep or cattle can be run. The property information was obtained from Kaipara District council, which is presented in Table 5. The rates have been calculated for the estimated portion of the land that is available for land-based primary production, i.e. excluding the area occupied by the house and curtilage. This is a standard methodology for tax deductibility purposes for assessing rates. The property rates were then subtracted off the combined operational profit to provide a total return for each property.

The definition and methodology to determine economic viability has been presented at the NZ Agricultural and Resource Economics Society Conference in 2024[4] and published in the New Zealand Institute of Primary Industry Management (NZIPIM) journal. The term "economically viable" is used to describe a project that provides an overall positive net economic contribution to society after all costs and benefits have been accounted for. When researching commercial viability, the Cambridge dictionary defines it as "the ability of a business, product, or service to compete effectively and to make a profit." Compete effectively and make profit identifies that we need to cover real-world and genuine costs. Only then can we determine if an operation is economically viable. This is different to having a positive gross margin, EFS or EBITRm.

To be economically viable, I would suggest that the income from the farm needs to be sufficient to cover:

(i) Operating costs, e.g. wages, animal health, fertiliser, repairs and maintenance, etc

(ii) Fixed costs such as rates, insurance, administration.

(iii) Depreciation cost

(iv) A surplus then available that is sufficient for:

  (a) Debt servicing and debt repayment or an appropriate return on the capital investment if there is little or no debt, or the lease cost if the property is not owned by the operator;

  (b) Ongoing maintenance and development of the farm and the business.

Essentially, the farming business needs to produce a return on investment and/or adequate debt servicing, or the cost of leasing the property. At least one of these will be an essential requirement of any economically viable enterprise. A viable farming operation in the real world must be one that an objectively reasonable person would choose to undertake.

[4] Journeaux - Definition of Farm Economic Viability.pdf

To remove subjectiveness, for this assessment I have used (i) to (iv) (a) above, adopting a debt servicing allowance, to understand the economic return and viability from the land-based primary production for the various properties and the overall viability for the Subject Site.

In assessing the debt servicing required, the land value has been used rather than the improvement and capital value, to understand the profitability required for an agricultural business to service the relevant level of debt.

Presented in Table 5 is the property/operations liabilities, which includes the Kaipara District Council rates and interest for the land asset.

- Property information for rates and land valuation have been used as total annual liabilities for the properties within the Subject Site.
- Total current revenue using industry values.
- Land has been valued based on the Kaipara District Council rates database.
- A long-term (30 year) average interest rate of 7% has been used[5].
- A nominal 30% debt loading has been assumed (70% equity), which is a conservative level for arable farms.
- Note that principal repayments have not been included in the liabilities.
- Total Subject Site economic baseline is a loss of -$289,744.
- Only three of the properties will make enough profit to pay the adjusted rates.

[5] Exchange rates and Wholesale interest rates - Reserve Bank of New Zealand - Te Pūtea Matua (rbnz.govt.nz) 1993-2023 years with a 2.2% bank margin applied to the 90 bank bill monthly average yield

Table 5: Economic viability of all properties for land-based primary production

Map Ref	Effective Rates	Optimised Land Use Areas (ha)			EFS for Property	Economic Viability Test ($)		
		Drystock	Non-Effective	Total Effective		Ratable Land Value	Total Property Liabilities	Economic Viability
1	$ -	0.00	0.08	0.00	$ -	$ 750,000	$ -	$ -
2	$ 4,244	0.30	0.00	0.30	$ 245	$ 700,000	$ 14,700	-$ 14,455
3	$ -	0.00	0.30	0.00	$ -	$ 700,000	$ -	$ -
4	$ -	0.00	0.30	0.00	$ -	$ 700,000	$ -	$ -
5	$ -	0.00	0.30	0.00	$ -	$ 700,000	$ -	$ -
6	$ -	0.00	0.30	0.00	$ -	$ 580,000	$ -	$ -
7	$ 4,244	0.31	0.00	0.31	$ 252	$ 700,000	$ 14,700	-$ 14,448
8	$ -	0.00	0.38	0.00	$ -	$ 715,000	$ -	$ -
9	$ 3,001	0.40	0.00	0.40	$ 327	$ 600,000	$ 12,600	-$ 12,273
10	$ -	0.00	0.42	0.00	$ -	$ 730,000	$ -	$ -
11	$ -	0.00	0.46	0.00	$ -	$ 750,000	$ -	$ -
12	$ -	0.00	0.52	0.00	$ -	$ -	$ -	$ -
13	$ -	0.00	0.59	0.00	$ -	$ 750,000	$ -	$ -
14	$ 1,951	0.45	0.24	0.45	$ 365	$ 600,000	$ 8,193	-$ 7,829
17	$ -	0.00	1.05	0.00	$ -	$ -	$ -	$ -
18	$ -	0.00	1.11	0.00	$ -	$ 1,410,000	$ -	$ -
19	$ 3,216	1.16	0.05	1.16	$ 952	$ 760,000	$ 15,303	-$ 14,351
20	$ 3,630	2.05	0.22	2.05	$ 1,672	$ 720,000	$ 13,652	-$ 11,979
22	$ 3,612	2.57	0.29	2.57	$ 2,098	$ 720,000	$ 13,585	-$ 11,487
23	$ -	0.00	2.97	0.00	$ -	$ 2,400,000	$ -	$ -
24	$ 4,159	4.69	0.69	4.69	$ 3,838	$ 950,000	$ 17,394	-$ 13,555
25	$ 5,624	7.22	0.00	7.22	$ 5,907	$ 1,725,000	$ 36,225	-$ 30,318
27	$ 14,528	19.55	0.25	19.55	$ 15,984	$ 4,000,000	$ 82,939	-$ 66,956
28	$ 19,481	28.63	2.29	28.63	$ 23,409	$ 5,940,000	$ 115,502	-$ 92,093
		67.33	**12.81**	**67.33**	**$ 55,049**	**$ 27,600,000**	**$ 344,793**	**-$ 289,744**

7.0 Assessment of Alternative Urban Development Options

This section provides an analysis of potential expansion of alternative residential and mixed-use areas within the Mangawhai area. This is in response to Clause 3.6(4)(b) of the NPS-HPL which requires consideration of other practicable and feasible options for providing the required development capacity.

With regards to LUC classes within the Kaipara district, there is an estimated 33,257 ha of HPL[6], which is 10.7 % of the total area. The LUC breakdown for the district is presented in Figure 11. The total combined area of HPL within a property is 42.37 ha, which is 0.127% of the available HPL within the district. While cumulatively and as mapped by the NZLRI, there is 64.35 ha of HPL, which is 0.193% of the district HPL. Neither of these would be considered as a significant proportion of loss within the district. It is important to balance out the demand and need for urban rezoning and selection of appropriate areas that will have less impact and preferably consist of areas with lower productive capacity or constraints for future land-based primary production.

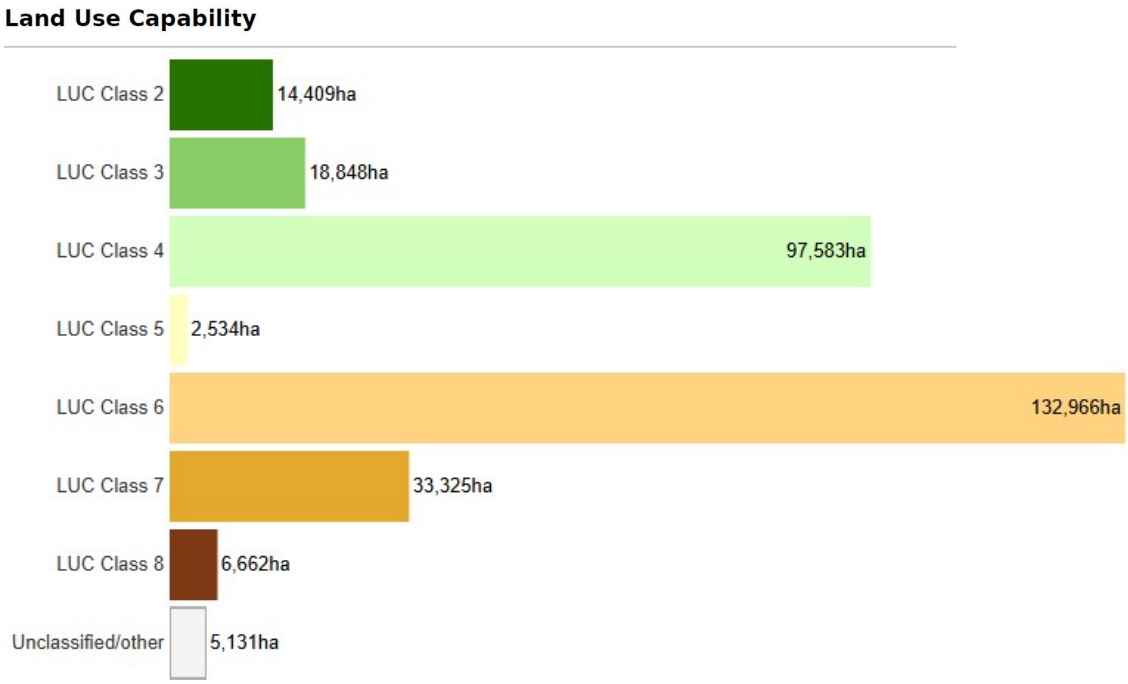

Figure 11: Summary of Land Use Classification within the Kaipara District

AgFirst has assessed rural land surrounding the Mangawhai area with regards to productive capacity to determine whether there are any other reasonably practicable and feasible options for providing additional development capacity (i.e. are there already areas surrounding Mangawhai that is not on highly productive land or with a lower productive capacity than the assessment Site).

[6] Manaaki Whenua – Landcare Research. Our Environment, Territorial Authorities, Waikato District LUC map.

Alternative options for urban rezoning to meet the demand for Mangawhai have been provided by Urban Economics (UE), The Planning Collective (TPC) and HLM. These areas have been assessed against a criterion developed for reasonably practicable and feasible options within the NPS-HPL. The locations of these areas are presented in Figure 60 of the Economic and Property Research Report and ranked in Figure 61[7]. It was recommended that the focus for the comparison was on the top three ranked alternative options, which were also close to the Mangawhai Town, had harbour frontage and close to beaches, with these areas identified as desirable locations for residents. This is discussed in Section 22 of the UE report.

> *"Overall, this illustrates that the general preference of residents in Mangawhai is to be close to the harbour and beaches, which offers residents access to high levels of amenity, such as recreation, swimming and boat access. As such, a fundamental requirement for meeting future demand and enabling growth in Mangawhai is for housing to be provided adjacent to the harbour or beaches, which will enable the town to meet the requirement of a "well-Functioning Urban Environment" as outlined in the NPS-UD (as it related to housing demand)."*

The highest ranked areas include the expansion of the Mangawhai Township to the north of the Subject Site (the Northern Area), a peninsula to the South of Mangawhai (Western Area) and an area to the south of the Subject Site (Southern Area). These areas are shown on Figure 12.

Given the current land use being a mix of arable, extensive drystock and lifestyle operations, if the Development Site were to be re-zoned in stages, the areas that were not developed would remain in production. This would not be as viable for some of the commercial alternatives that are not as fragmented as the Subject Site.

This comparative assessment is a desktop only analysis and has taken into account a range of characteristics, which are relevant to the relative productive capacity including:

- Size of growth cell and expansion opportunity
- Current land use and highest and best use
- Surrounding land use
- NZLRI LUC classification, soil characteristics and drainage
- Constraints with regard to productive capacity
- Potential economic baseline

[7] Economic and Property Research – Proposed Plan Change Mangawhai, Evaluation of Economic Costs and Benefits, April 2025

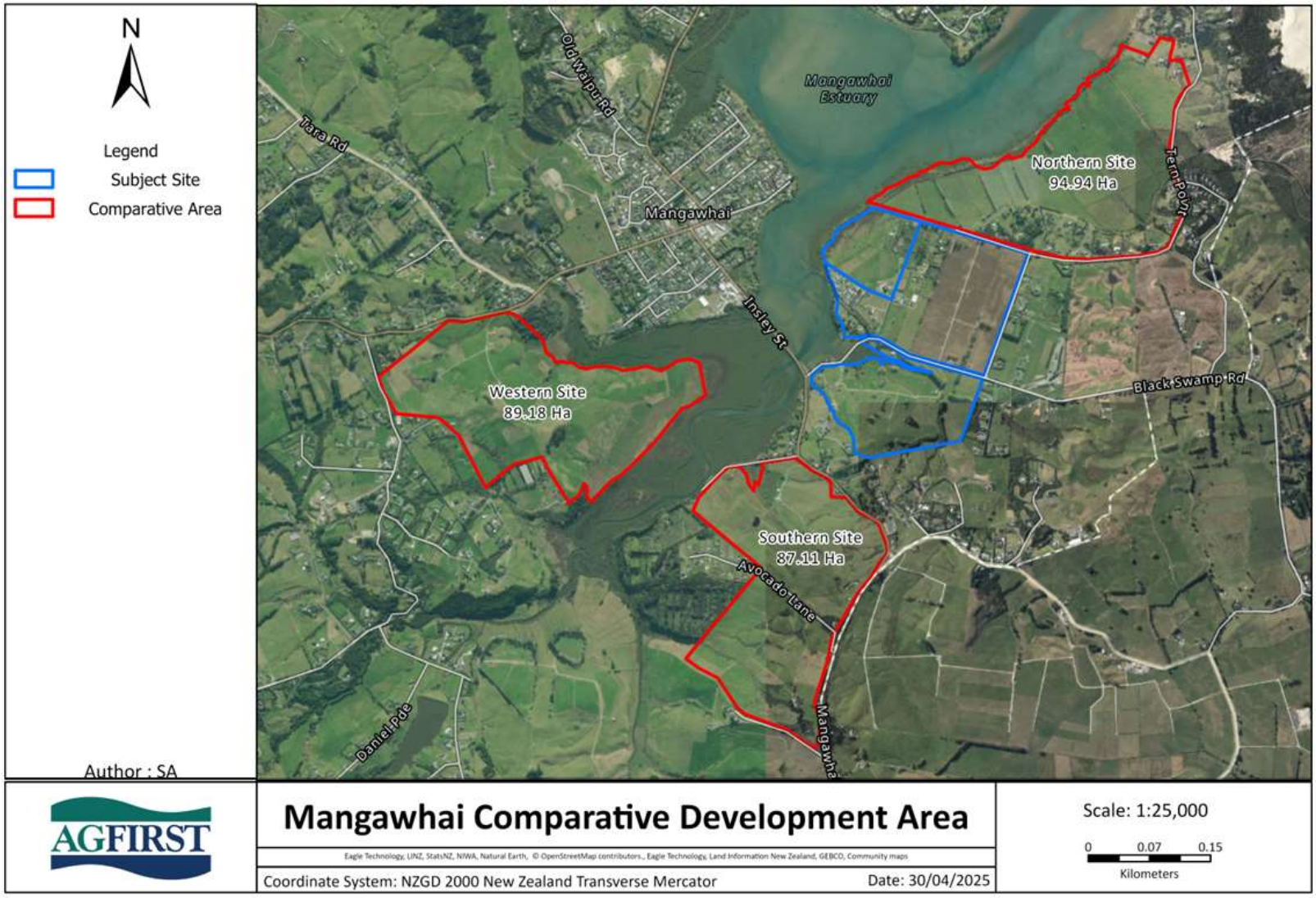

Figure 12: Mangawhai alternative urban development options

7.1 Northern Site

The Northern Site is zoned rural under the Kaipara District plan and has the ability to develop an estimated 95 ha of net land area. It appears to currently be utilised as a dry stock grazing block. This area has non-reversable land fragmentation constraints with non-productive land to the north (Mangawhai harbour) and surrounded by lifestyle blocks on the eastern and southern sides. The area is shown in Figure 13.

AgFirst have reviewed the NZLRI, NRC Soil maps and Lidar information of the Northern Site. In summary, the LUC classification (Figure 14) shows mostly LUC 3w14, with LUC 4e23 on the northeastern corner and LUC 3s14 to the south where the lifestyle blocks are located. The soil map (Figure 15) shows the 3w14 and 3s14 areas are One Tree Point peaty sand which are a poorly drained podzol soil. This supports the 3w wetness limitation. The 4e23 area is classified as a Red Hill sandy loam, this is a well-drained mature sand soil. When overlaying the Lidar slope (Figure 16), the 4e23 soils to the north are likely more versatile than reported, with this area being flat. The Lidar map shows elevations to the south and east (which are developed into lifestyle and residential properties).

The Northern Site may not be able to provide the same extent of development capacity. This is because of the large impact that coastal inundation has on the area (Figure 17). Within the Subject Site, the area affected by coastal inundation is restricted to rural lifestyle and not planned for residential or mixed use. While potentially there is a flat area with free draining soils to the north that could be suitable for horticulture or arable, the coastal inundation would limit the productive capacity and versatility, where landowners may not wish to invest into costly infrastructure.

The current land-based primary production types within the Northern Site is an approximately 65 ha drystock farm. While this is considered to be a small scale, it is significantly larger than any of the productive contiguous areas within the Subject Site with more HPL available. An expansion of this area would have a greater fragmentation impact and higher loss of HPL in the district. Although physically, the 3w area within the northern site is very similar to the Subject Site, the northern site is not restricted by the same level of internal fragmentation and development. AgFirst considers that the Subject Site has a relatively lower productive capacity than this Northern Site. The majority of the Northern Site is productive, and while having wetness limitations, free from significant constraints with regard to drystock farming.

Using these desktop tools and consideration of surrounding land uses, AgFirst believes that the highest and best use for the Northern Site would be drystock farming, with some potential for arable cropping to the north.

Expansion opportunity	Approximately 100+ ha
Constraints for land-based primary production	Wetness limitations across most of the Site. Lack of amalgamation opportunities outside of Site for expansion. Coastal inundation
Current land use	Drystock farming
Surrounding land use	Rural Zone, lifestyle blocks, Mangawhai Harbour
NZLRI LUC classification	LUC 3 & 4
Soil characteristics	One Tree Point sandy peat, poorly drained Podzol Red Hill sandy loam, well drained mature sand
Environmental constraints	Proximity to waterways and harbour. Coastal inundation
Economic limitations	Potentially not economically viable, given small scale and lack of productive types
Land use potential	Potential for pastural grazing (current) with arable to the north.
Comparison to Site	The soils and land in this area are overall of a higher quality, with an area of flat well drained soils to the north. There are also fewer non-reversable land fragmentation constraints with approximately 65 ha of contiguous productive land. Therefore, AgFirst considers this Northern Site has a higher productive capacity when compared to the Subject Site.

Figure 13: Comparative Northern Site

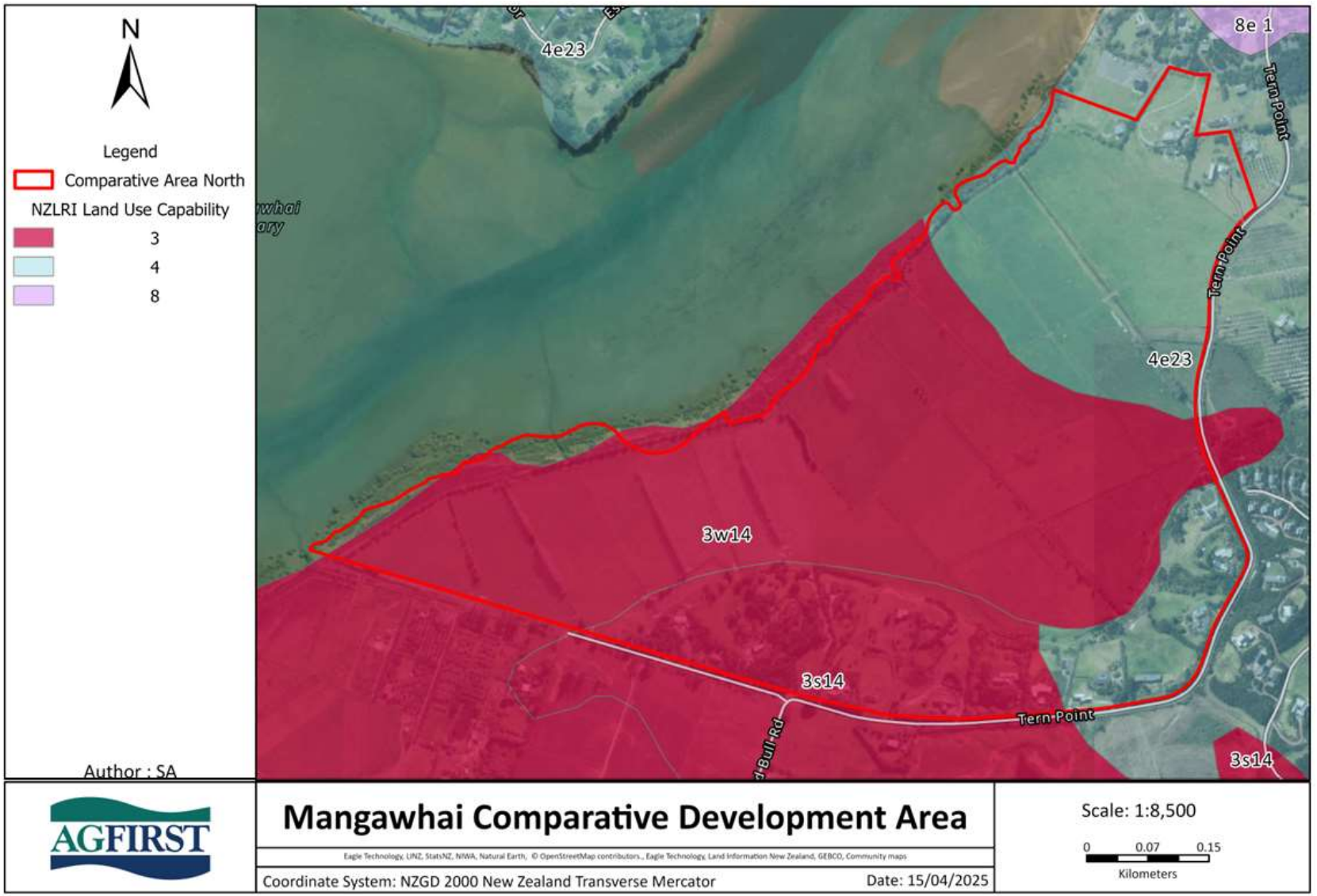

Figure 14: NZLRI Classification of land for the Northern Site

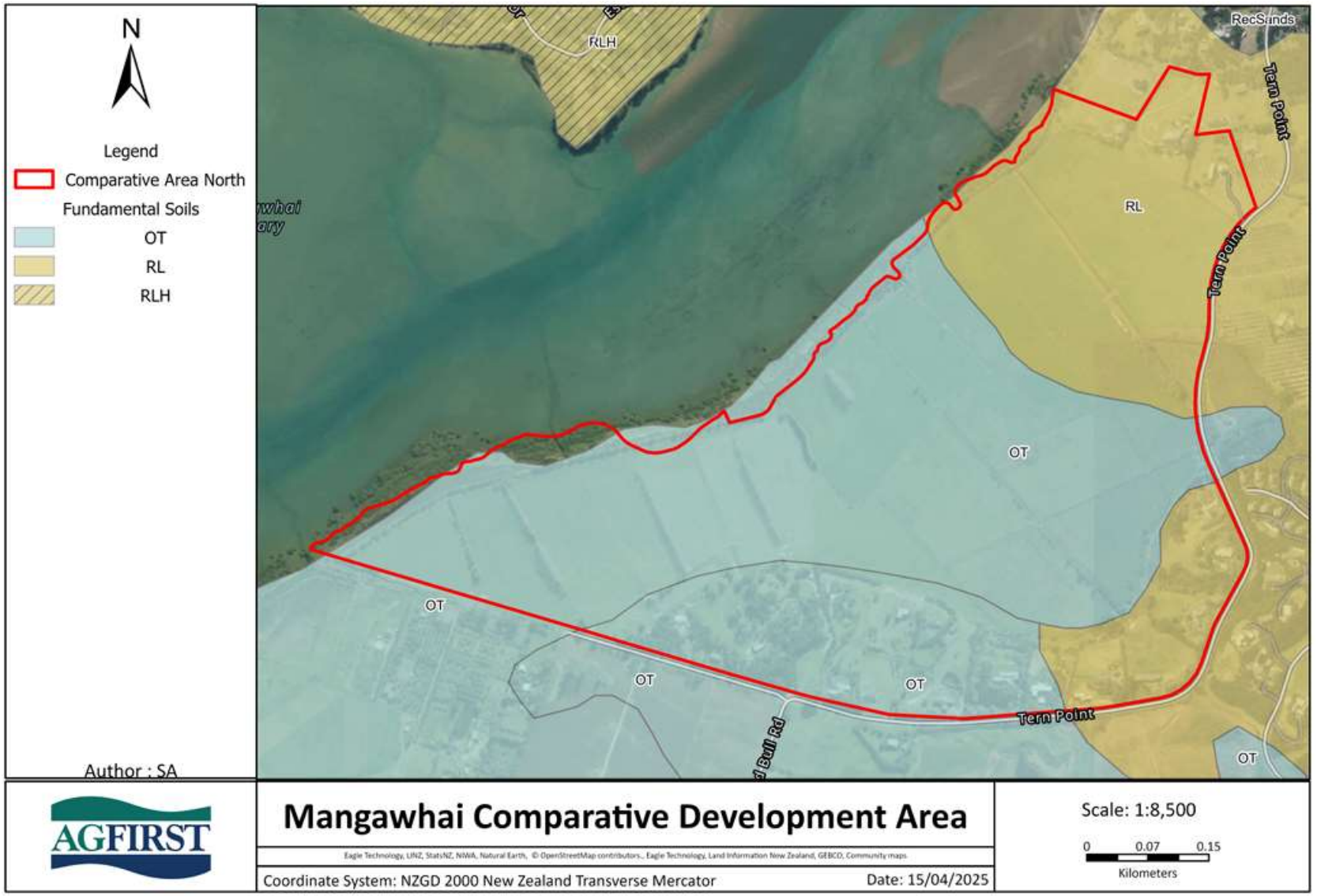

Figure 15: Soil representation of land for the Northern Site

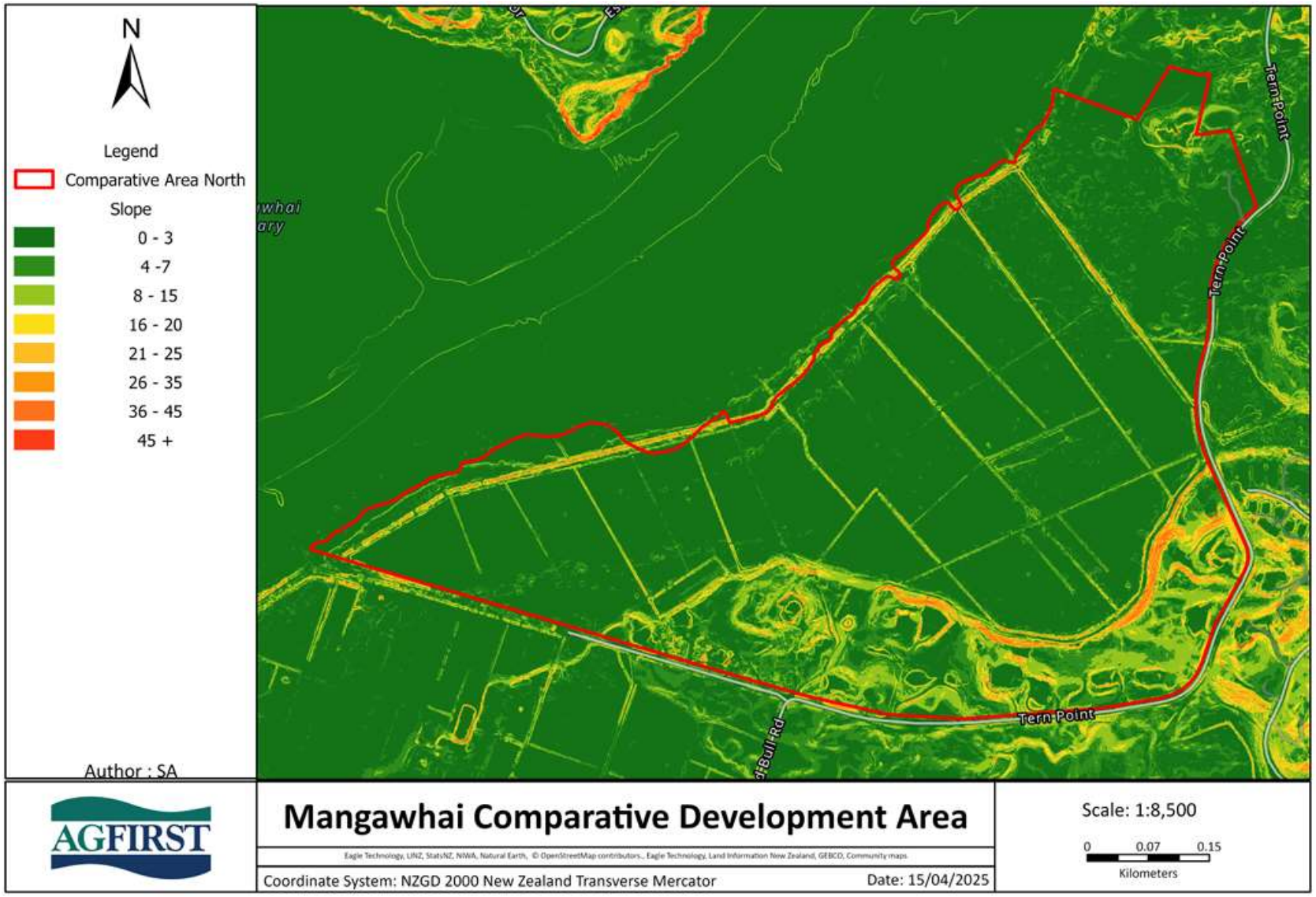

Figure 16: Slope map of land for the Northern Site

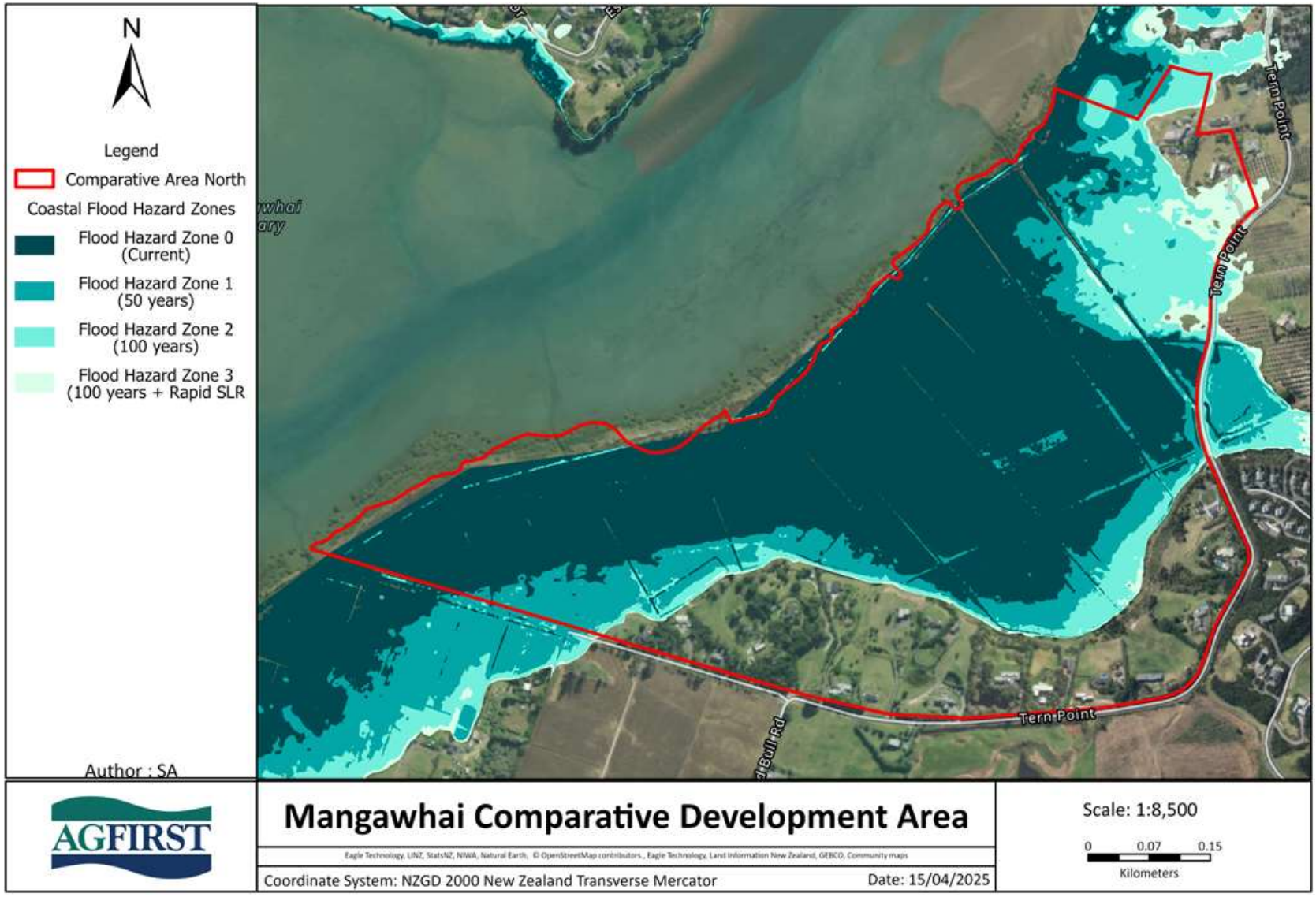

Figure 17: Impact of Coastal Inundation of land for the Northern Site

7.2 Western Site

The Western Site is zoned rural under the Kaipara District Plan and has the ability to develop an estimated 89 ha of net land area. It appears to currently be utilised as a drystock grazing block, which was converted from a dairy farm at the end of the 2023 season (historical google maps street view shows the removal of the Fonterra Supply Number in 2023). This area is a large contiguous productive block, however, is bordered by non-productive land. The area is shown in Figure 18.

AgFirst have reviewed the NZLRI, NRC Soil maps and Lidar information of the Western Site. In summary, the LUC classification (Figure 19) shows mostly LUC 3w14 and LUC 3e11 to the east, with LUC 4e9 to the west. The soil map (Figure 20) shows the lowland areas to the east are One Tree Point peaty sand which are a poorly drained podzol soil. This supports the 3w wetness limitation. The remainder of the soils, 3e11 and 4e9 are classified as a Mahurangi fine sandy loam, which are strongly leached to moderately podsolised (moderately to poorly drained). When overlaying the Lidar slope (Figure 21), the Western Site has a mix of contour, with some lowland flats to the east, with the remainder of the Site being rolling to strongly rolling, reflective of the mix of 3e and 4e land.

Similar to the Subject Site, there is a small harbourside lowland area to the east that is impacted by coastal inundation (Figure 22). The remainder of the Western Site is elevated above the harbour.

The Western Site is currently used as a drystock farm, with approximately 88 ha of effective area. While this is considered to be a moderate to small scale, it is significantly larger than any of the productive contiguous areas within the Subject Site with approximately half of the area mapped as HPL. An expansion of this area would have a greater fragmentation impact and higher loss of HPL in the district, largely due to the larger and more consolidated block of land. While the soils and slopes may have similar characteristics to the Subject Site this Site offers more versatility, productive capacity and commercial viability. There is evidence of horticultural operations adjacent to the Western Site, indicating that on flat areas, these soils are highly versatile. AgFirst considers that the Subject Site has a relatively lower productive capacity than this Western Site. The majority of the western Site is productive, and while having wetness and slope limitations, there is no internal fragmentation to overcome to enable it to be a productive long-term operation.

Using these desktop tools and consideration of surrounding land uses, AgFirst believes that the highest and best use for the western site would be drystock farming, with some potential for arable cropping and horticulture on flat/rolling elevated areas. It should be noted that while this Site was in dairy farming, the fact it has transitioned into drystock speaks to the potential limitations.

Expansion opportunity	Approximately 100+ ha
Constraints for land-based primary production	Wetness limitations across most of the Site. Slope constraints for arable, horticulture and CVP
Current land use	Drystock farming
Surrounding land use	Rural Zone, lifestyle blocks, drystock farms, Mangawhai Harbour, horticulture.
NZLRI LUC classification	LUC 3 & 4
Soil characteristics	One Tree Point sandy peat, poorly drained Podzol. Mahurangi fine sandy loam, moderate to poorly drained podzol.
Environmental constraints	Proximity to waterways and harbour. Erosion for sloping areas.
Economic limitations	Scale large enough to be a stand alone drystock or dairy farm. Could have support with pockets of arable land use.
Land use potential	Potential for pastural grazing (current) with arable on the elevated flat/rolling areas.
Comparison to Site	The soils and land in this area are overall of a higher quality, with areas of flat/rolling land. There are also fewer non-reversable land fragmentation constraints with approximately 88 ha of contiguous productive land. Therefore, AgFirst considers this Western Site has a higher productive capacity when compared to the Subject Site.

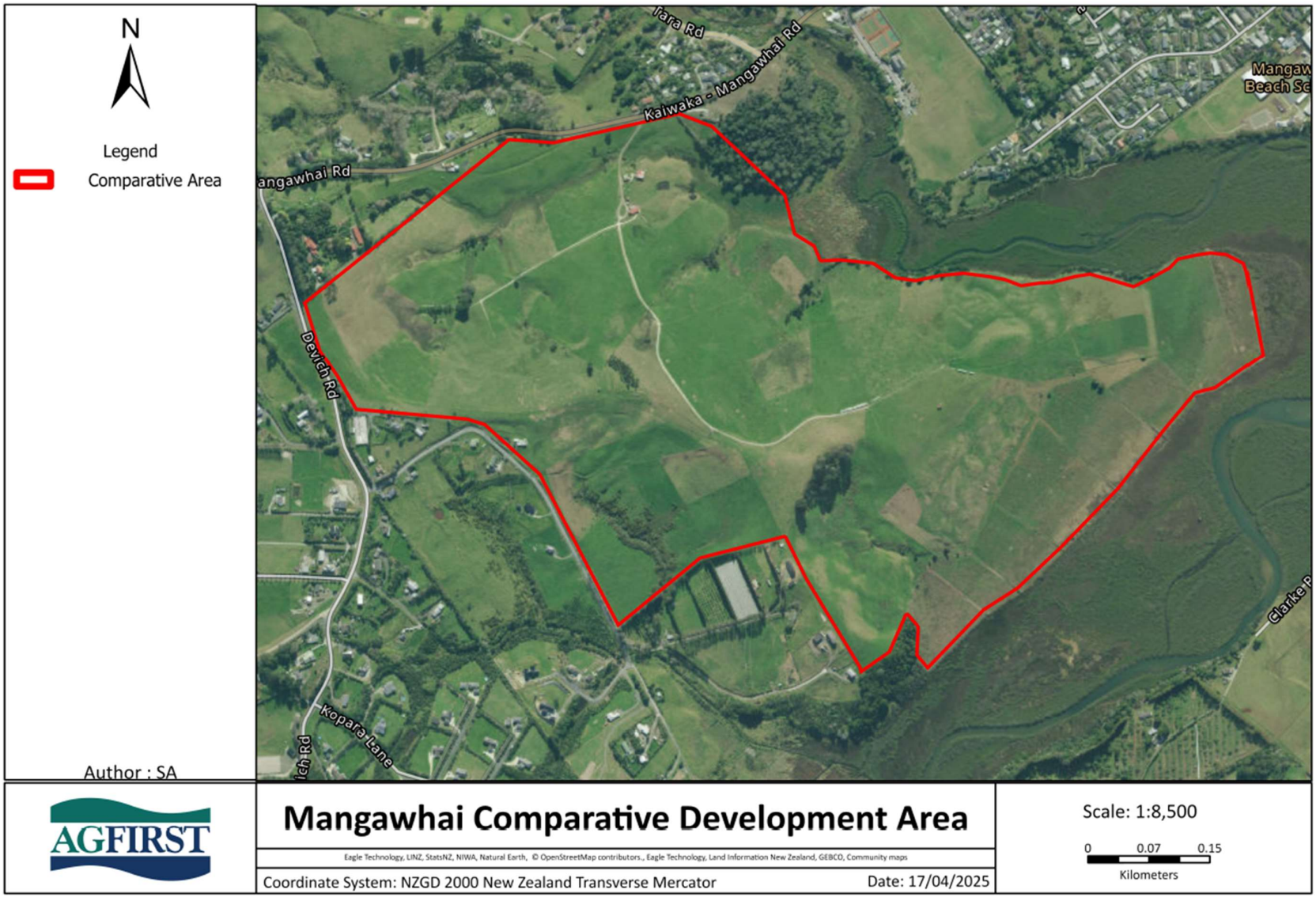

Figure 18: Comparative Western Site

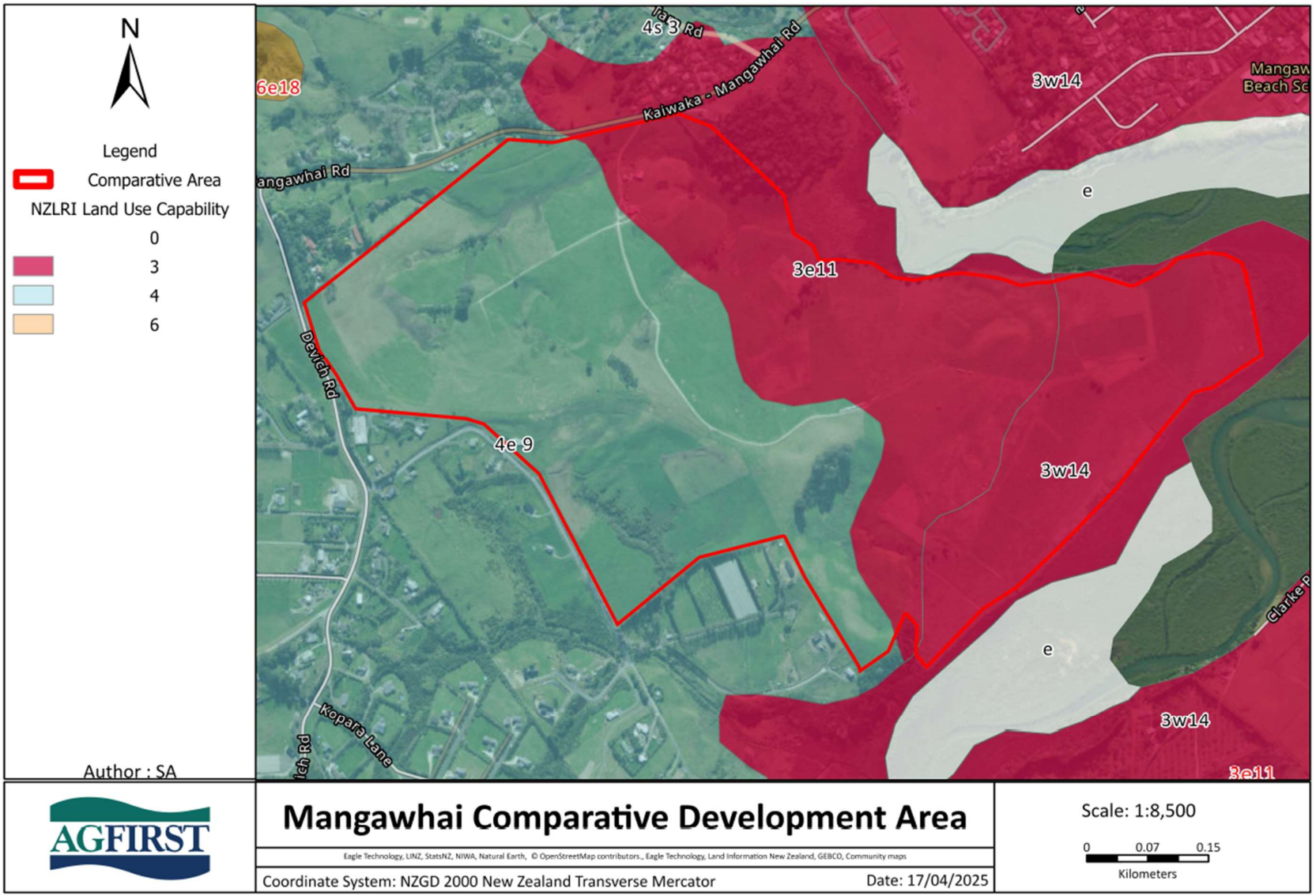

Figure 19: NZLRI Classification of land for the Western Site

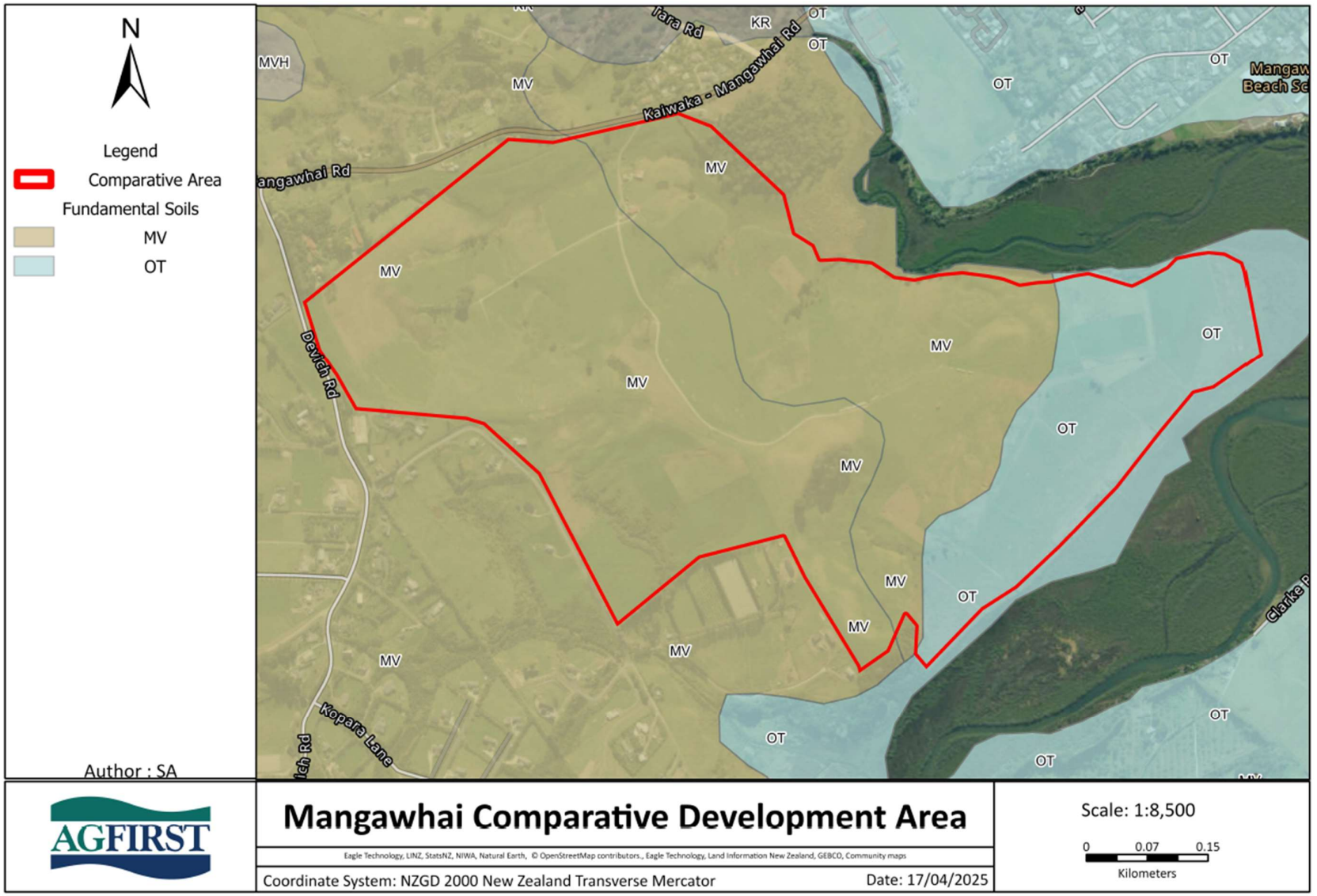

Figure 20: Soil representation of land for the Western Site

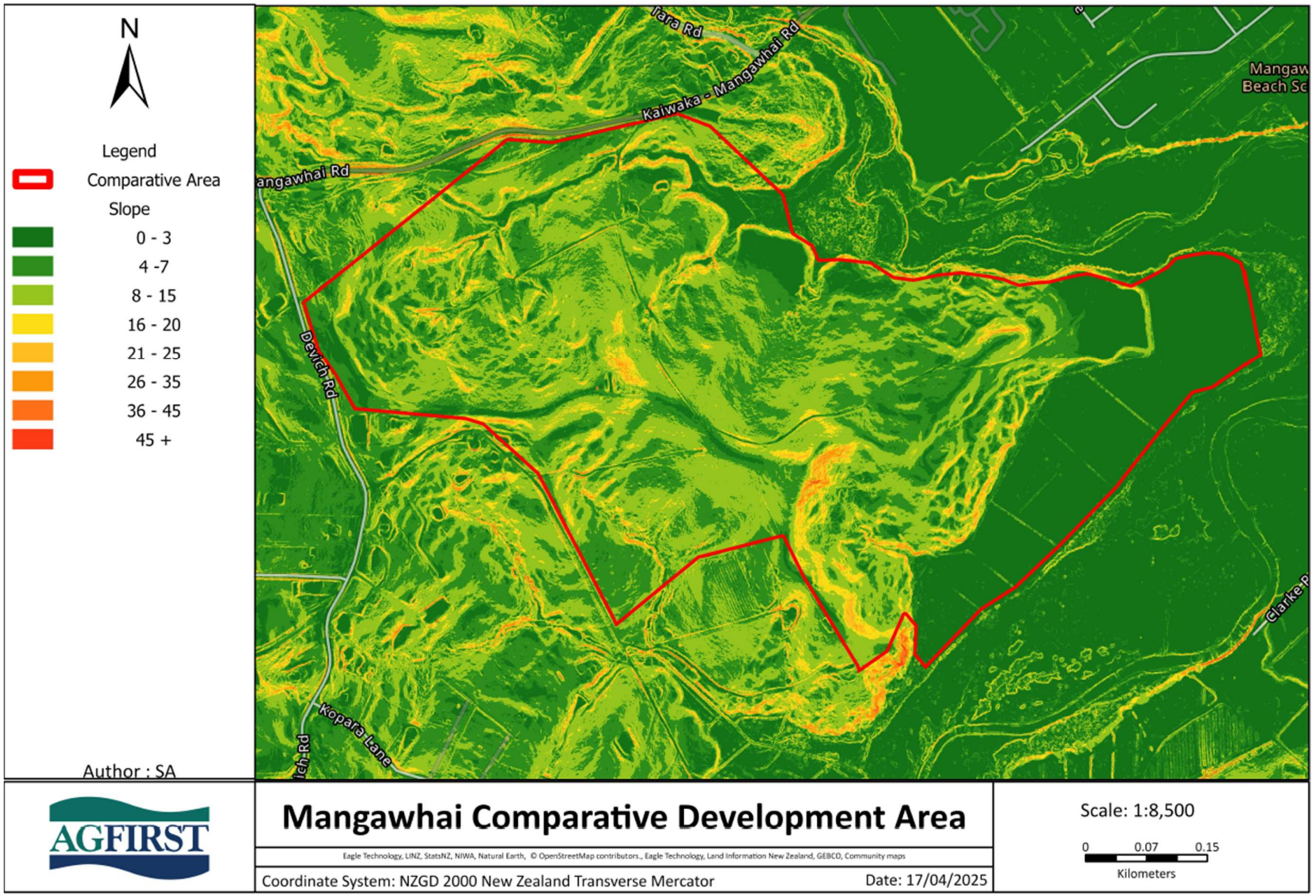

Figure 21: Slope map of land for the Western Site

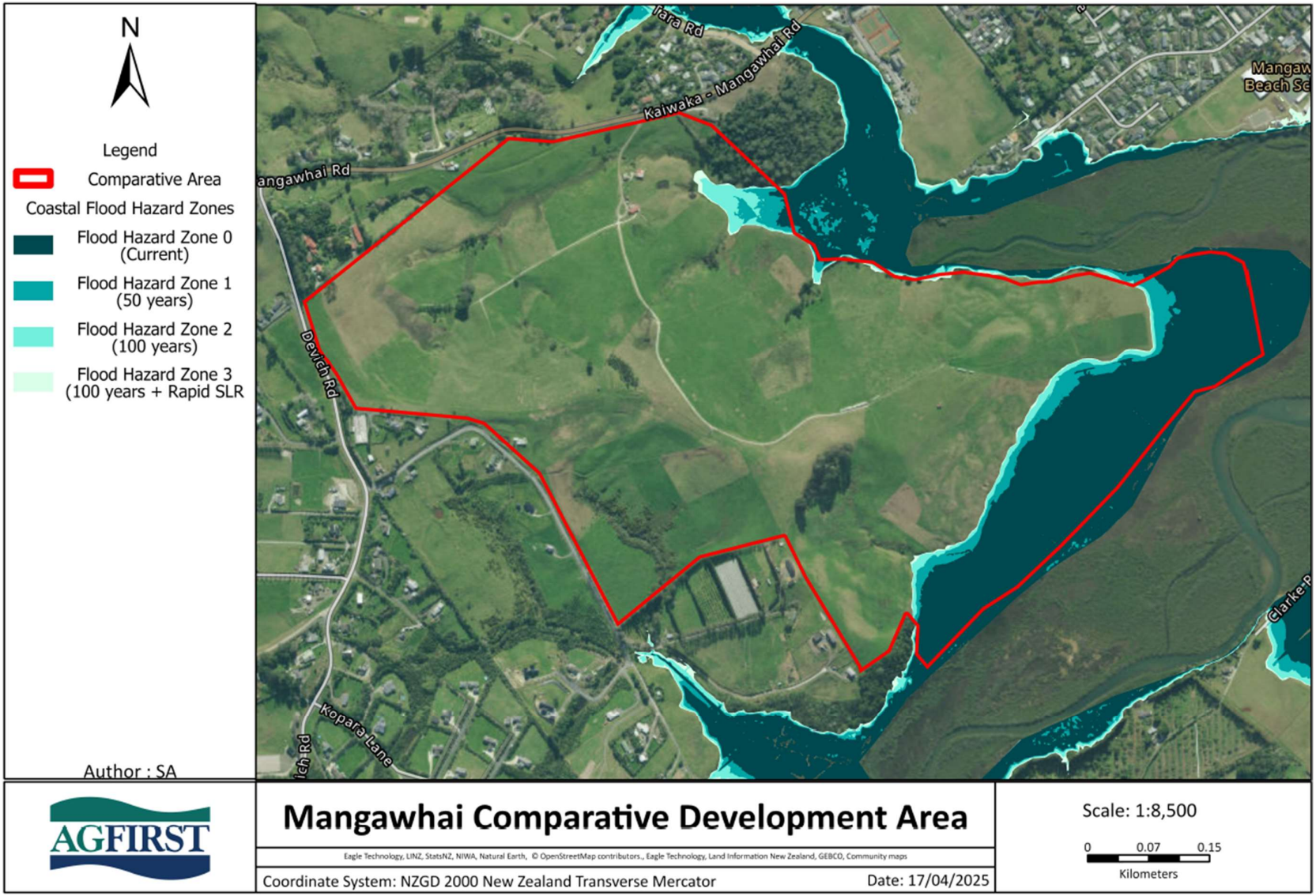

Figure 22: Impact of Coastal Inundation on Western Site

7.3 Southern Site

The Southern Site is zoned rural under the Kaipara District plan and has the ability to develop an estimated 87 ha of net land area. It appears to currently be utilised as a drystock grazing block, which was converted from a dairy farm. The block is split across two properties (north and south of Avocado Lane). There is a ribbon of lifestyle properties to the north and a cluster to the west, otherwise, the Southern Site is surrounded by productive farmland, mostly dairy farms. The area is shown in Figure 23.

AgFirst have reviewed the NZLRI, NRC Soil maps and Lidar information of the Southern Site. In summary, the LUC classification (Figure 24) shows a split of LUC 3 (3e11 and 3w14) and LUC 4 (4e9). The 3w14 is the lowland area located to the northwest beside the harbour. The 3e11 is through the centre and along the western boundary of the block, while the remainder is 4e9 (east and north). The soil map (Figure 25) shows the 3w14 areas are One Tree Point peaty sand which are a poorly drained podzol soil. This supports the 3w14 classification. The remainder of the soils, 3e11 and 4e9, are classified as a Mahurangi fine sandy loam, which are strongly leached to moderately podsolised (moderately to poorly drained). When overlaying the Lidar slope (Figure 26), the Southern Site has a mix of contour, with some lowland flats to the northwest, with the remainder of the Site being rolling to strongly rolling, reflective of the mix of 3e and 4e land. Amongst these are some steeper ridges, particularly to the south.

Similar to the Subject Site, there is a small harbourside lowland area to the northwest that is impacted by coastal inundation (Figure 27). The remainder of the Southern Site is elevated above the harbour.

The Southern Site is currently used as a drystock farm, with approximately 85 ha of effective area. While this is considered to be a moderate to small scale, it is significantly larger than any of the productive contiguous areas within the Subject Site with approximately half of the area mapped as HPL. An expansion of this area would have a greater fragmentation impact and higher loss of HPL in the district, largely due to the larger and more consolidated block of land, and connection of the Southern Site with other productive areas. The southern block of the Southern Site is part of a larger drystock operation and backs onto a dairy farm. While the soils and slopes may have similar characteristics to the Subject Site, this Site offers more versatility, productive capacity and commercial viability. There is approximately a 20 ha avocado orchard immediately to the west of the Southern Site, indicating that on flat areas, these soils are highly versatile. AgFirst considers that the Subject Site has a relatively lower productive capacity than this Southern Site. The majority of the Southern Site is productive, and while having wetness and slope limitations, there is no internal fragmentation to overcome to enable it to be a productive long-term operation.

Using these desktop tools and consideration of surrounding land uses, AgFirst believes that the highest and best use for the Southern Site would be drystock farming, with some potential for arable cropping and horticulture on flat/rolling elevated areas. It should be noted that while this Site was in dairy farming, the fact it has transitioned into drystock speaks to the potential limitations.

Expansion opportunity	Approximately 100+ ha
Constraints for land-based primary production	Wetness limitations across most of the Site. Slope constraints for arable, horticulture and CVP
Current land use	Drystock farming
Surrounding land use	Rural Zone, lifestyle blocks, dairy farms, drystock farms, Mangawhai Harbour, avocado orchard.
NZLRI LUC classification	LUC 3 & 4
Soil characteristics	One Tree Point sandy peat, poorly drained Podzol. Mahurangi fine sandy loam, moderate to poorly drained podzol.
Environmental constraints	Proximity to waterways and harbour. Erosion for sloping areas.
Economic limitations	Scale large enough to be a stand alone drystock or dairy farm. Could have support with pockets of arable land use.
Land use potential	Potential for pastural grazing (current) with arable on the elevated flat/rolling areas.
Comparison to Site	The soils and land in this area are overall of a higher quality, with areas of flat/rolling land. There are also fewer non-reversable land fragmentation constraints with approximately 85 ha of contiguous productive land. Therefore, AgFirst considers this Southern Site has a higher productive capacity when compared to the Subject Site.

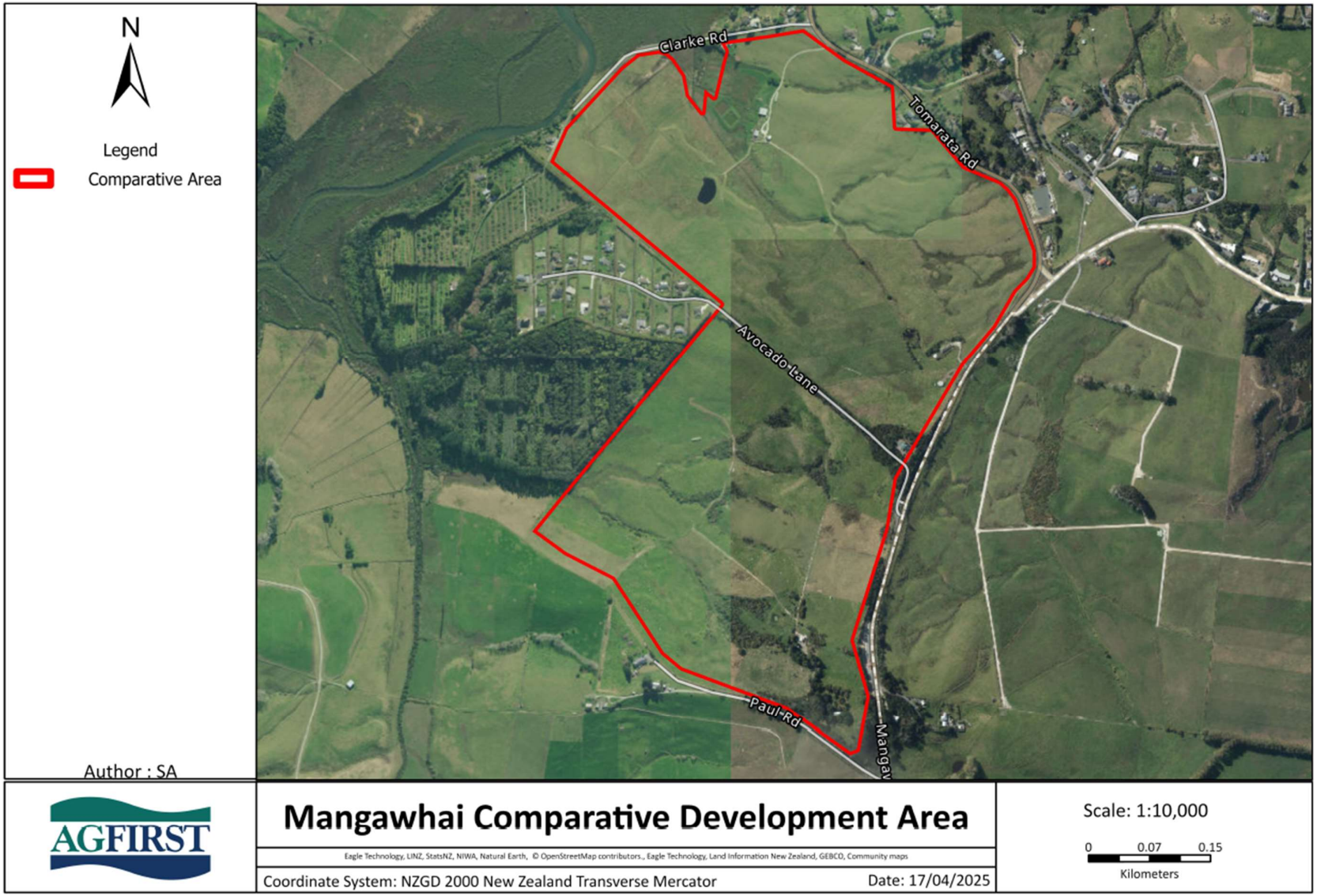

Figure 23: Comparative Southern Site

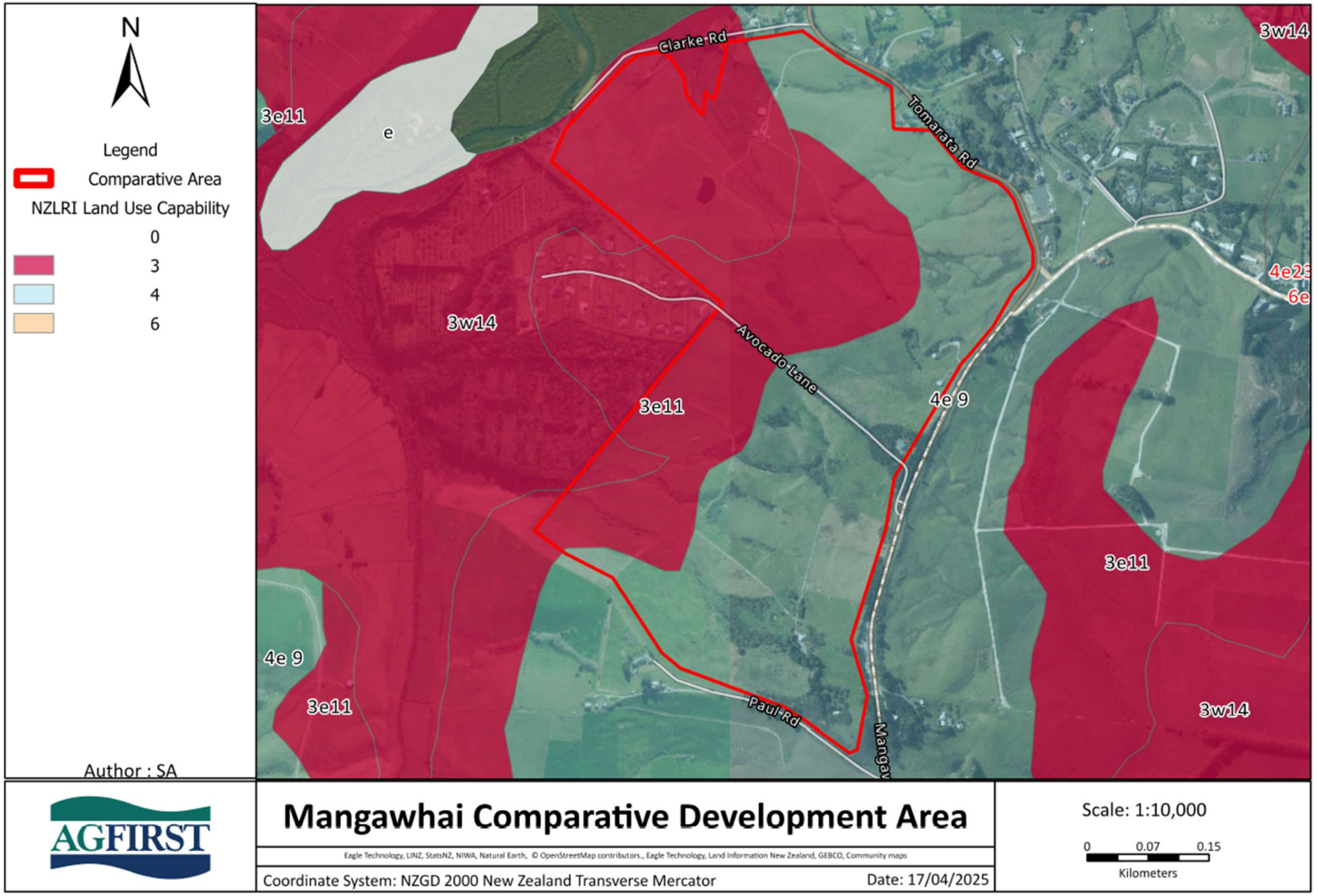

Figure 24: NZLRI Classification of land for the Southern Site

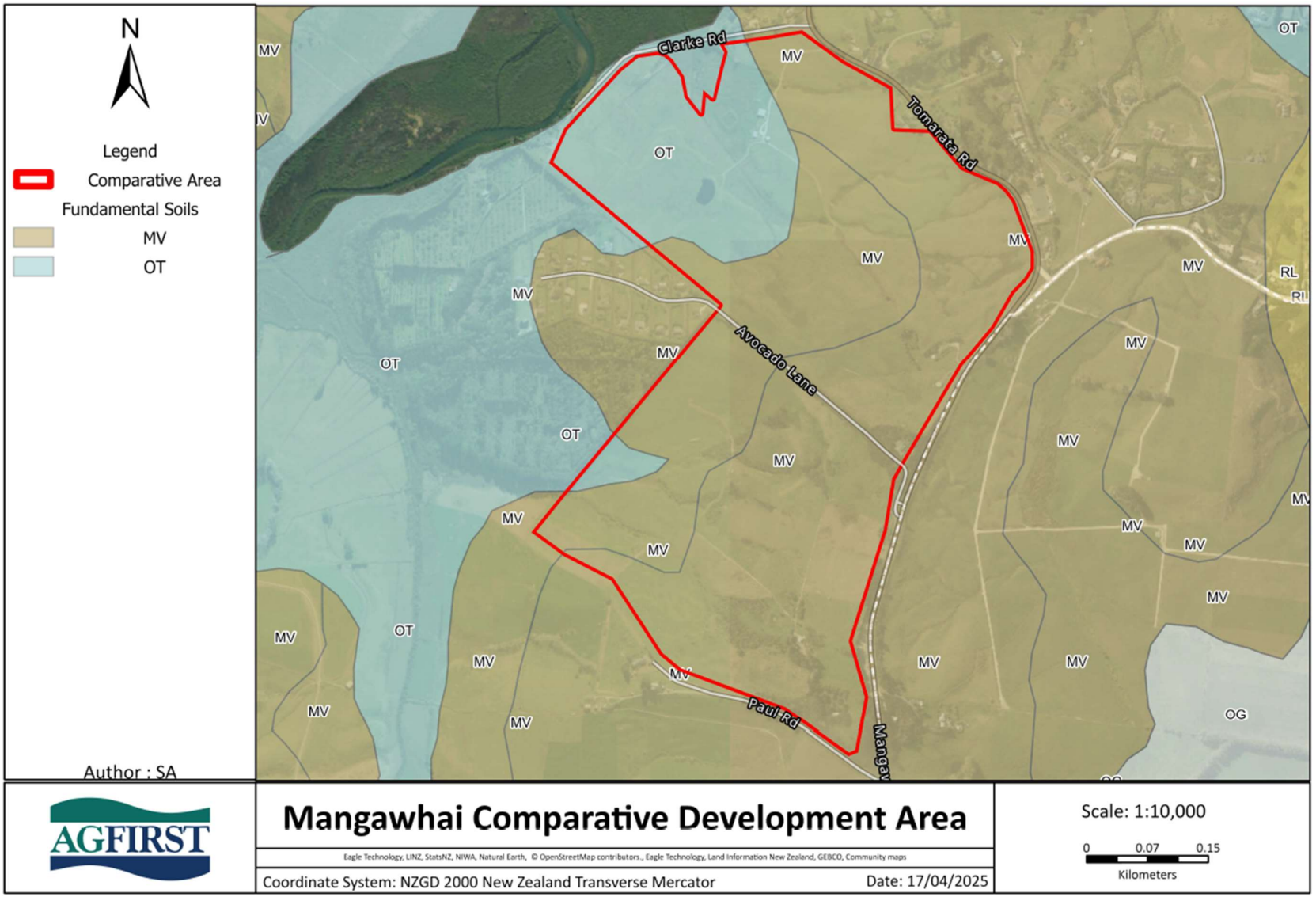

Figure 25: Soil representation of land for the Southern Site

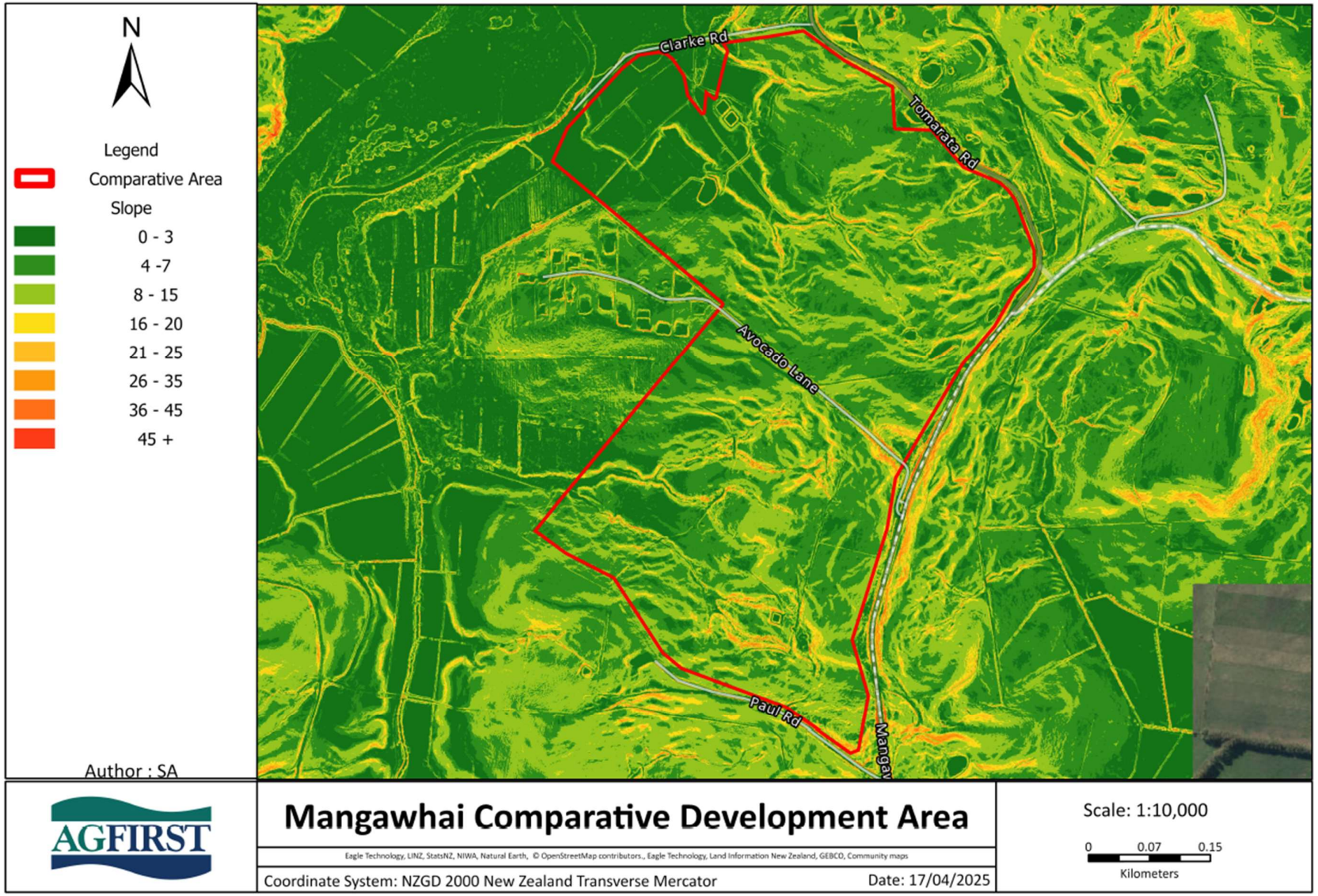

Figure 26: Slope map of land for the Southern Site

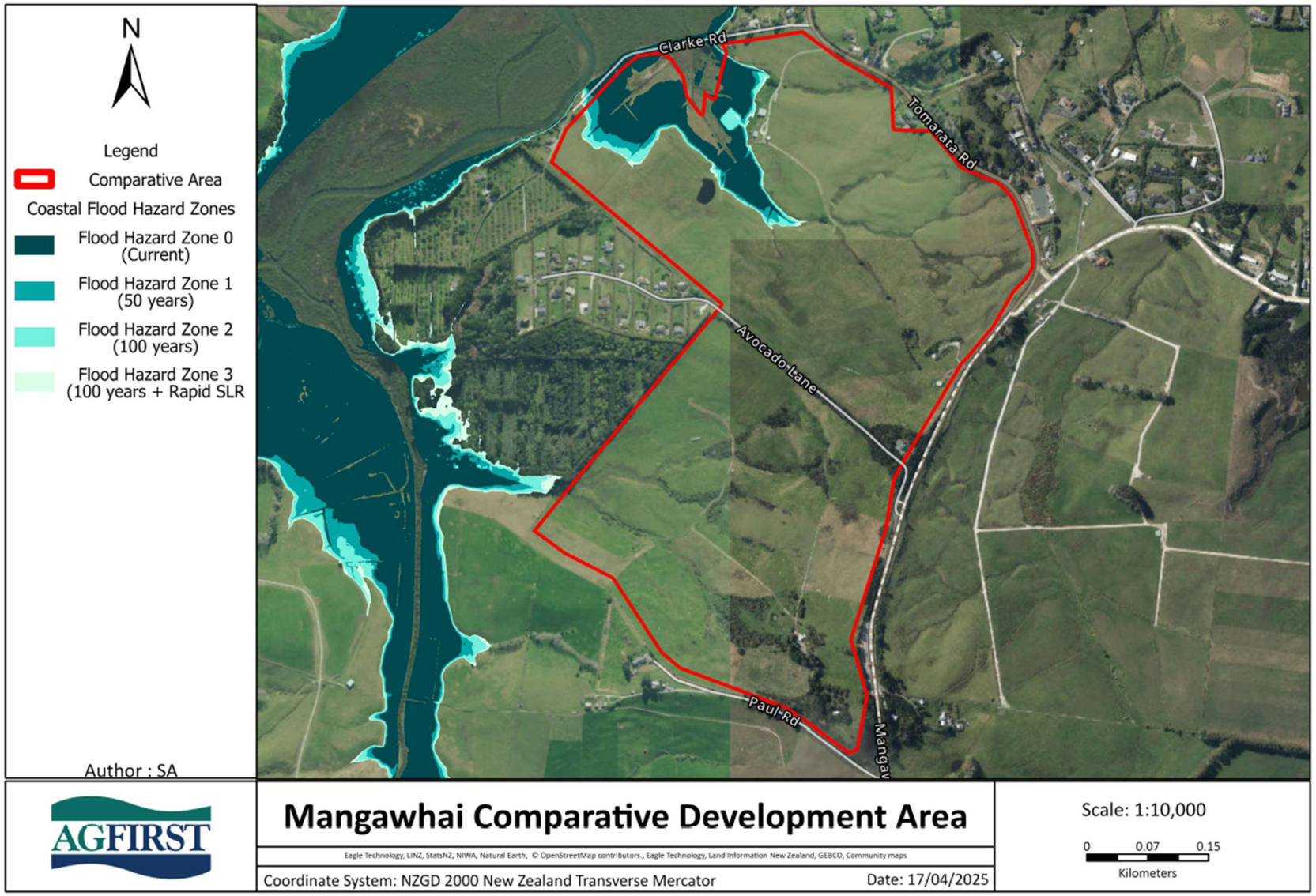

Figure 27: Impact of Coastal Inundation on Southern Site

8.0 Summary

AgFirst has been engaged to assess the Subject Site against the provisions of Clause 3.6 of the NPS-HPL. This allows Territorial authorities to rezone rural land for urban use when it has been identified that there are no other reasonably practicable and feasible options for providing the required development capacity. To provide a robust assessment, AgFirst have identified:

- The constraints that limit and restrict land-based primary production;
- The versatility of the Subject Site and alternative production opportunities (highest and best use);
- The economic return from this operation to inform the cost benefit analysis; and
- A comparison of the Subject Site against other potential expansion sites for urban rezoning.

While the majority of the Subject Site is defined as HPL by the transitional definition under the NPS-HPL, the fragmentation and soil limitations restrict the productive capacity.

- The highest and best use has been limited to the drystock farming. Alternatives including arable, horticulture, CVP and dairy are not reasonably practicable.
- The Subject Site is constrained by non-reversable land fragmentation, and the inability to amalgamate the Subject Site with surrounding land uses to improve versatility because of:
  - The Mangawhai Harbour area to the west.
  - Lifestyle blocks to the north, east and south.
  - The Subject Site is not large enough to be a commercial pastoral grazing operation or standalone dairy farm.

Given the constraints identified above, and a comparison against alternative options, it is evident that the Subject Site has lower quality HPL and a lower relative productive capacity. Therefore, AgFirst believes that the re-zoning of the Subject Site meets the requirements of Clause 3.6(4)(b) of the NPS-HPL insofar as there are no other reasonably practicable and feasible options which are better suited in terms of impacts on productive land for providing additional urban development capacity in Mangawhai.

Furthermore, the costs of the loss of the Subject Site due to the proposed urban rezoning will be low. The productive nature of the Subject Site is already significantly compromised due to the fragmentation, which has encroached this area over the past ten years. AgFirst does not consider that the loss of the well below average productivity from the Subject Site will have a significant loss on the district's production, and the rezoning into urban would not cause any fragmentation or further disruption of additional highly productive land.

Annexure A: Addendum Report for the Cabra Soil and resource Report, Mangawhai – Hanmore Land Management, July 2024

Addendum Report for the Cabra Soil and Resource Report, Mangawhai.

Prepared By: Ian Hanmore

Prepared For: Cabra

19th July 2024

Hanmore Land Management

TABLE OF CONTENTS

1.0 INTRODUCTION

An initial Soil and Resource Report (HLM report) was completed for the land located on Black Swamp and Raymond Bull Roads, Mangawhai that is the subject of a re-zoning request. That report mapped the soils and Land Use Capability (LUC) classifications at the site (see Figure 1 below) and classified them in relation to the National Policy Statement for Highly Productive Land (NPS-HPL).

Since that report was completed an Environment Court ruling (*Blue Grass Limited v Dunedin City Council*) has stated that more recent and more detailed mapping does not affect the land use classifications by the New Zealand Resource Inventory (NZLRI) with respect to the definition of Highly Productive Land (HPL) specified in the NPS HPL.

This addendum report has been prepared to provide further assessment of the effects of the proposed plan change on HPL following the Environment Court ruling. The report focusses on the potential productivity of the soils and LUC classification at the site in order to enable an assessment in terms of Clause 3.6 (4) of the NPS HPL.

Figure 1. The area outlined in black referred to in this report as "the site" and covered by the HLM report.

2.0 HIGHLY PRODUCTIVE LAND CLASSIFICATION

The NPS-HPL requires regional councils to map the HPL in their regions and include it in their operative regional policy statement. Until this work has been completed the interim definition of HPL includes land that is:

a) is

(i) zoned general rural or rural production; and

(ii) is predominantly LUC 1, 2, or 3 land;

b) but is not:

(i) identified for future urban development; or

(ii) subject to a Council initiated, or an adopted, notified plan change to rezone it from general rural or rural production to urban or rural lifestyle.

With LUC 1, 2, or 3 land being defined as land identified as "Land Use Capability Class 1, 2, or 3, as mapped by the NZLRI or by any more detailed mapping that uses the Land Use Capability classification".

The recent Environment Court ruling (*Blue Grass Limited v Dunedin City Council*) however stated that during the interim period only the New Zealand Resource Inventory could be used to define LUC classes 1-3 and that more detailed mapping carried out since the NPS-HPL came into effect could not be used to refine or clarify those classifications.

If the land is identified as HPL then more detailed assessments can inform whether there are any pathways as provided in Clauses 3.6, 3.8, 3.9 and 3.10 of the NPS to enable rezoning, subdivision or development on HPL.

2.1 HPL on the Cabra Properties

The NZLRI mapped the majority of the land at the site as LUC units 3w 4 and 3s 4 with a smaller area of 4e 5 (see Figure 2 below). Soils on the class 3 area are dominated by One Tree Point peaty sandy with smaller areas of Tangitiki sandy loam and sand and Ruakaka peaty sandy loam. Based on these LUC classifications these areas are classed as HPL under the NPS-HPL. The rest of the site is mapped by the NZLRI as LUC unit 4e 5. Soils on the class 4 area are dominated by Mahurangi fine sandy silt loam but also include Warkworth clay and sandy clay loam. In our opinion, the HLM report remains highly relevant from an effects perspective in terms of the actual productive capacity of the land, the constraints on the land for primary production, and the economic viability of primary production on the land.

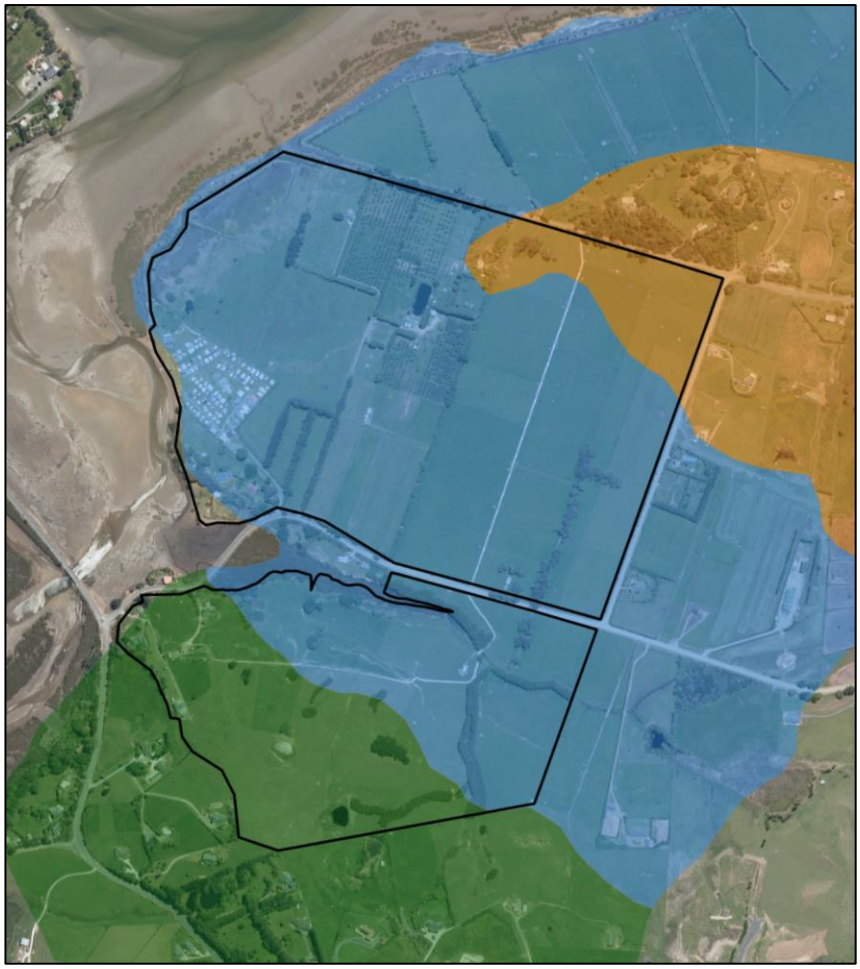

Figure 2. LUC mapping by the NZLRI. Blue shading 3w 4, orange shading 3s 4, green shading 4e 5

3.0 MAPPING SCALE AND DATA RELIABILITY

The LUC system can be used at many different scales and for many different purposes. From a very detailed scale over a small area such as a horticulture activity on less than one hectare to regional planning covering many thousands of hectares. As such, it is vital that the scale of mapping used is fit for the purpose it was intended (Hewlett & Lilburne 2003, Lynn et al 2009). When this protocol is not followed the output information can be unreliable and misleading or result in information that is at best nonsense (Hewlett & Lilburne 2003, Lynn et al 2009).

It is generally recommended that for any given mapping scale there is on average, one observation site per square centimetre of published map, with a minimum acceptable limit of one site per four square centimetres of published map (Grealish 2019).

- At a 1:50,000 scale, 1cm^2 of published map covers 25ha. Following the observation guidelines this equates to, at most, one observation per 25ha and at the least one observation per 100ha.
- At a scale of 1:5,000 a 1cm^2 area of published map covers 0.25ha. Following the observations guidelines outlined above this equates to, at most, one observation per 0.25ha and at the least one observation per hectare of land.

- At 1:10,000 it equates to at most one observation per hectare and at the least one observation per four hectares.

Historically the information that could be contained in a map was constrained by the limitations of producing and publishing the hard copy maps. At any particular map layout size only so much information could be recorded and published. Thus, the larger the area being mapped, the less site-specific information that could be recorded and published. For example, at a scale of 1:50,000 a 20cmx20cm square map would cover 10,000ha and would on average have at most 400 mapping observations and at the least 100. As the map was a fixed hard copy there was no way of manipulating it to try and extract more detailed information. The scale to information relationship was fixed (Hewlett & Lilburne 2003).

With the development of computerised Geographic Information Systems (GIS), the scale to information relationship is no longer fixed. The GIS allows the user to increase the scale of the map by zooming in to any point on the map to derive information for that specific location. This however is the process that Lynn et al 2009, Hewlett & Lilburne 2003, Grealish 2019 state should be avoided as it can yield unreliable information that can be misleading and at times total nonsense, the reason being that the scale of input data is not appropriate to the detailed scale of information acquisition (Hewlett & Lilburne 2003) and is specifically warned against in the LUC survey handbook.

This, however, is exactly what is being done when the NZLRI data is used to determine LUC classifications and therefore HPL classifications at a farm scale. The NZLRI is mapped at a scale of 1:50,000. It was never intended for farm scale use, and as such sufficient data was not gathered for that purpose. It is therefore inappropriate to use the LUC classifications in this way because it can yield unreliable results at the farm or site-specific level.

At 1:50,000 it is likely, that at best, there has been one observation made at the Paddison Rural Land for the NZLRI mapping and possibly no observations at all. The HLM report however has followed the correct mapping protocols set out in the LUC survey handbook (Lynn et al 2009) and the NZ soil mapping protocols and guidelines (Grealish 2019) and is therefore highly relevant in terms of the actual productive potential of the property and commensurate with the definition of LUC 1, 2, 3 land in the NPS HPL that will apply once the regional mapping process is complete.

The following section will discuss the potential productive capacity of the Paddison Rural Land based on the soil and LUC mapping carried out at the site and presented in the HLM report.

4.0 POTENTIAL PRODUCTIVE CAPACITY

4.1 The LUC System

The LUC system has been used in New Zealand since 1952 and helps achieve sustainable land development and management at farm, catchment, district, regional and nation scales (Lynn et al 2009). The system uses physical information recorded in a Land Resource Inventory (**LRI**) that includes soil type, parent material, landform and slope angle, erosion type and severity and vegetation cover to classify the land into one of eight LUC classes. This information is supplemented with information on climate, flooding risk, erosion history and the effects of past management practices.

The LUC categories are set out in section 3.2 of the HLM report dated 5th April 2024.

The four arable classes of land are further described as follows:

- Class 1 land is classified as the most versatile multi-use land with minimal limitations to arable use that is highly suitable for cultivation and can support many different crop types.
- Class 2 land is classified as very good land with only slight physical limitations to arable use that can readily be controlled by management and soil conservation practices and suitable for many cultivated crops.
- Class 3 land has moderate limitations to arable use which restrict the choice of crops that can be grown and the intensity of cultivation.
- Class 4 land has severe physical limitations to arable use that substantially reduce the range of crops that can be grown and make intensive soil conservation and management necessary with only occasional cropping possible.

4.2 The HLM Report

The HLM report found that after undertaking a site-specific assessment that the areas of LUC class 3 land were significantly smaller than those mapped by the NZLRI. The NZLRI has mapped all of the area on the northern side of Black Swamp Road, which covers 61.8ha, and 16.1ha of land on the southern side of Black Swamp Road as LUC class 3. The HLM report found that a total of 55.6ha of land was LUC class 3 with the balance comprised of LUC units 4e 5, 4e12, 4w 3, 4s 4, 6w 1, 6w 2, 7w 1, and developed areas and estuarine margins that could not be used productivity.

The HLM report found that the area of LUC class 3 land on the northern side of Black Swamp Road formed one large area but was fragmented by legal titles which range in size from 0.3ha to 19.8ha (see Figure 3 below). The four largest areas available for productive use cover 19.8, 7.2, 6.0 and 4.3 hectares. The remaining area is made up of smaller lots ranging from in size from 0.3ha to 2.9ha and often include a residential dwelling and other associated development

and buildings. The LUC class 3 area on the southern side of Black Swamp Road is fragmented into two areas by estuarine margins and a waterway and cover 2.3ha and 2.7ha.
Each of the three LUC class 3 units mapped by the HLM report at the site are listed in Harmsworth's (1996) LUC description as being suitable for horticulture, cereals for unit 3w 4, root and green fodder cropping and grazing. Average stock carrying capacity is listed as 13su/ha for units 3e 5 and 3s 4 and 17su/ha for unit 3w 4 that covers 52.4ha of the area.

Figure 3. LUC class 3 land mapped in the HLM report shown in green with all with LUC class 4, 5, 6 and 7 land and developed areas shown in brown. Legal title boundaries are shown by black outlines.

Wetness is the major limiting factor for production on the majority of this area. High water tables and poor drainage result in crop choices limited to annual crops and those that can tolerate wet soil conditions. Care needs to be taken when utilising these soils as over cultivation can cause a loss of soil carbon and soil structure and result in soil shrinkage and soil structure degradation.

The remaining area suitable for productive use, based on the site-specific assessment at the site is comprised of LUC units - 4e 5, 4e12, 4w 3, 4s 4,5e 2*, 6w 1, 6w 2, 7w 1. The productive potential of the class 4 units is discussed below (the HLM LUC map of the site is show in Figure 4 below).

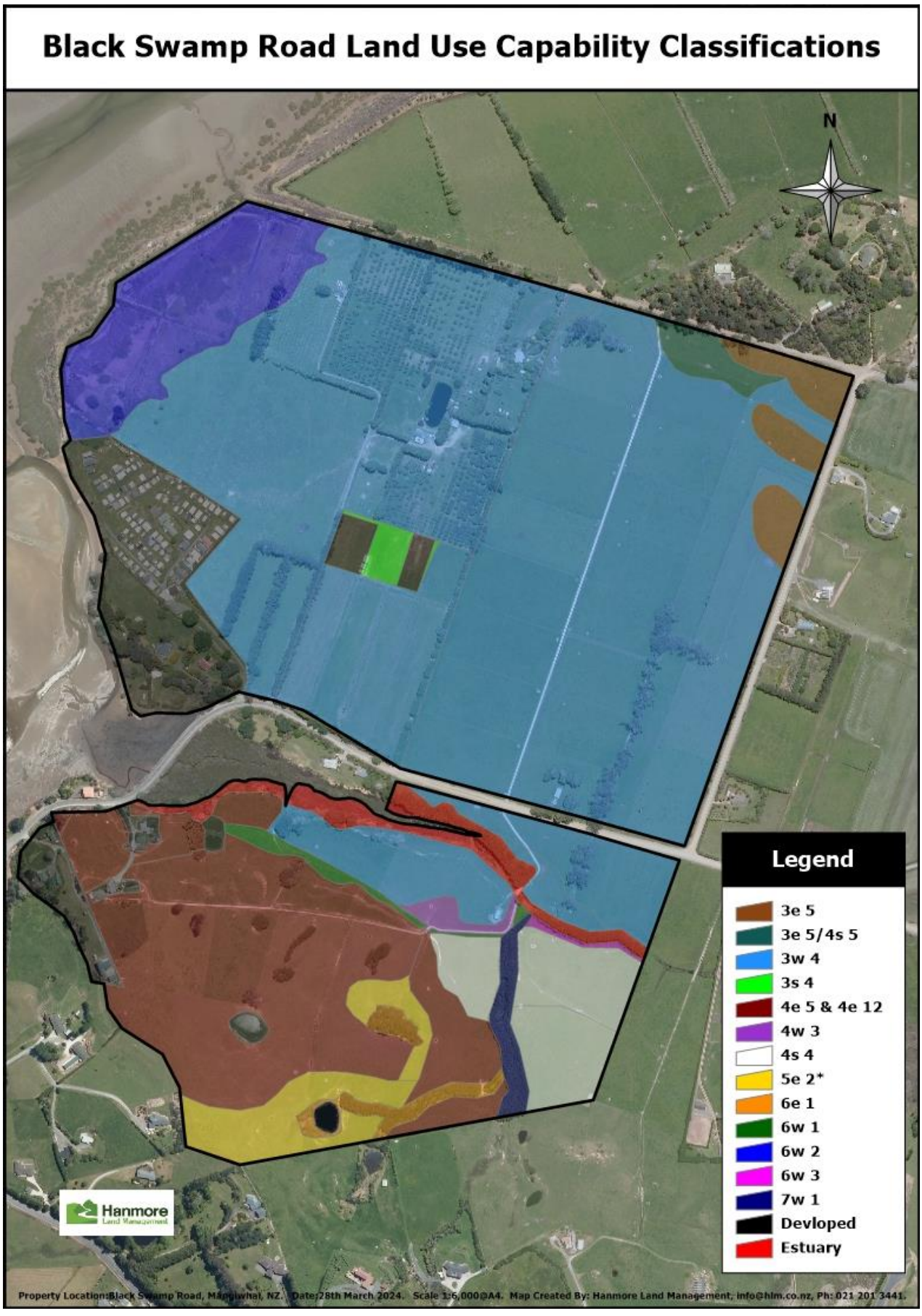

Figure 4. HLM LUC map

4s 4.

These units are dominated by weakly to moderately podzolised Mahurangi fine sandy loam and Hukerenui fine sandy loam soils. These soils are characterised by a formation of a white silica pan below the topsoil (visible in the Hukerenui soil profile picture in the HLM report) having poor drainage, poor structure, low pH, natural low fertility, they dry out quickly over the summer and become waterlogged over the winter. On the flat to undulating slopes at the site these soil characteristics present the major limitation to arable use. Cropping is limited to root and green fodder crops that are grown in rotation with pasture. They cannot support highly productive uses such as horticulture or regular arable cropping.

These units are most suited to grazing and forestry having an average stock carrying capacity of 13 stock units per hectare (where one stock unit equates to one 55kg ewe raising one lamb to weaning) and a radiata pine forestry site index (the mean height of the tallest 100 trees per hectare at 20 years of age) of between 26-32m. A 13 su/ha carrying capacity is classed as medium with FSI classed as medium to high by Harmsworth (1996) (full carrying capacity and FSI tables are contained in Appendix 1 and 2).

4e 5 and 4e12

These units include Mahurangi fine sandy loam and Warkworth clay and sandy clay loam soil with rolling to strong rolling (8-20^0) slopes. These soils are strongly leached to moderately podzolised and are not well suited to horticulture.

The greatest limitation on these units is the steepness of the slopes and subsequent erosion potential that preclude regular cropping. These units can be used for root and green fodder cropping in rotation with pasture, grazing and production forestry. They have a medium stock carrying capacity of 13 su/ha and a medium to high FSI of 28-32m.

4w 3

This unit is small covering only 0.39ha. It includes a wet transition zone between the rolling to strong rolling 4e 5 and 4e12 slopes and the 3w 4 flats. It receives runoff from the slopes above and has a severe wetness limitation to arable use. It also includes a surface drain which leaves little in the way of productive area. The wetness limitation precludes any regular cropping and making it suitable for root and green fodder cropping in rotation with pasture, grazing with a moderately high stock carrying capacity of 17su/ha and a very low FSI of <18m.

5e 2 and 6e 1

These units are steeper versions of the 4e 5 unit. The steepness of the slopes precludes any form of cropping with the units being suitable for grazing and forestry. Stock carrying capacity is low at 8su/ha with a high FSI of 31-34m.

6w 1, 6w 2 and 7w 1

These three units have wetness imitations that preclude any form of cropping, are to wet for production forestry and only suitable for low to medium level grazing. Unit 6w 1 and 7w 1 cover only small areas (0.5 and 0.7ha respectively) and form the riparian buffer zones adjacent to waterways. Due to their location these areas are suited to retirement for waterway protection and currently do not contribute significantly to the overall productive capacity of the site.

The area of unit 6w 2 is located at the estuarine margins on the northwestern side of the site. The sand soils in this area have very little development, have saltwater intrusion and support minimal developed pasture with rushes and salt marsh plant species dominating the area. As it is this area of the site has minimal productive potential and would be suitable for retirement and environmental benefits.

4.3 Overall Site Productivity Assessment

The most productive area of the site includes the peat and peaty sand flats represented by the LUC units 3w 4 and 3e 5 shown in Figure 4 above. These units can support horticulture, cereal cropping, root and green fodder cropping and a moderately high stock carrying capacity. There are however constraints to the use of the land due to fragmentation from the number of legal titles in the proposed area as well as the proximity to neighbours. The two largest titles (NA736/23 and NA726/14) at the site are located on the eastern side and cover 19.0ha and 8.1ha respectively (see Figure 5 below). These titles have sufficient size to potentially be used in a productive horticultural capacity and to buffer themselves from potential reverse sensitivity issues. The remaining two larger sites NA109B/157 that covers 5.3ha and 1011542 that covers 10.6ha (6.0ha of which is potentially productive) have challenges to their productive use due to the proximity and number of neighbours. Lot NA109B/157 has a six small lots on two of its boundaries while Lot 1011542 has seven smaller lots and the campground on three of its boundaries. Though the smaller lots on the boundaries of the potentially productive larger lots won't necessarily legally prevent their productive use they will likely cause some reverse sensitivity issues. Activities such as spraying and fertiliser application may well generate some opposition from residential neighbours. The remaining area of LUC class 3 land is fragmented within the smaller legal titles ranging in size from 0.3ha to 2.9ha and unlikely to be used in a productive way beyond residential and hobby gardens/orchards.

Figure 5. LUC class 3 land shown in green with legal title boundaries

5.0 RURAL LAND ON THE EDGES OF MANGAWHAI

Six areas bordering Managwhai have been examined to determine their LUC classes and productivity potential to compare with that of the proposed zone change site at Black Swamp Road. The data for this analysis is sourced solely from the NZLRI. A map showing the areas investigated and the LUC classes present is shown on the following page in Figure 6 with the Proposed Plan Change (PPC) area outlined in red.

5.1 Area 1 - Bream Tail

This area to the north of Mangawhai is made up of LUC class 4, 6 and 7 land. It is typically rolling to steep with strongly leached to podzolised soils. Productivity on the steeper areas is limited to grazing and forestry while the rolling to strong rolling slopes area suitable for grazing, forestry and root and green fodder cropping. There is no HPL in this are as defined by the NPS-HPL. This area has less productive potential than the PPC area at Black Swamp Road.

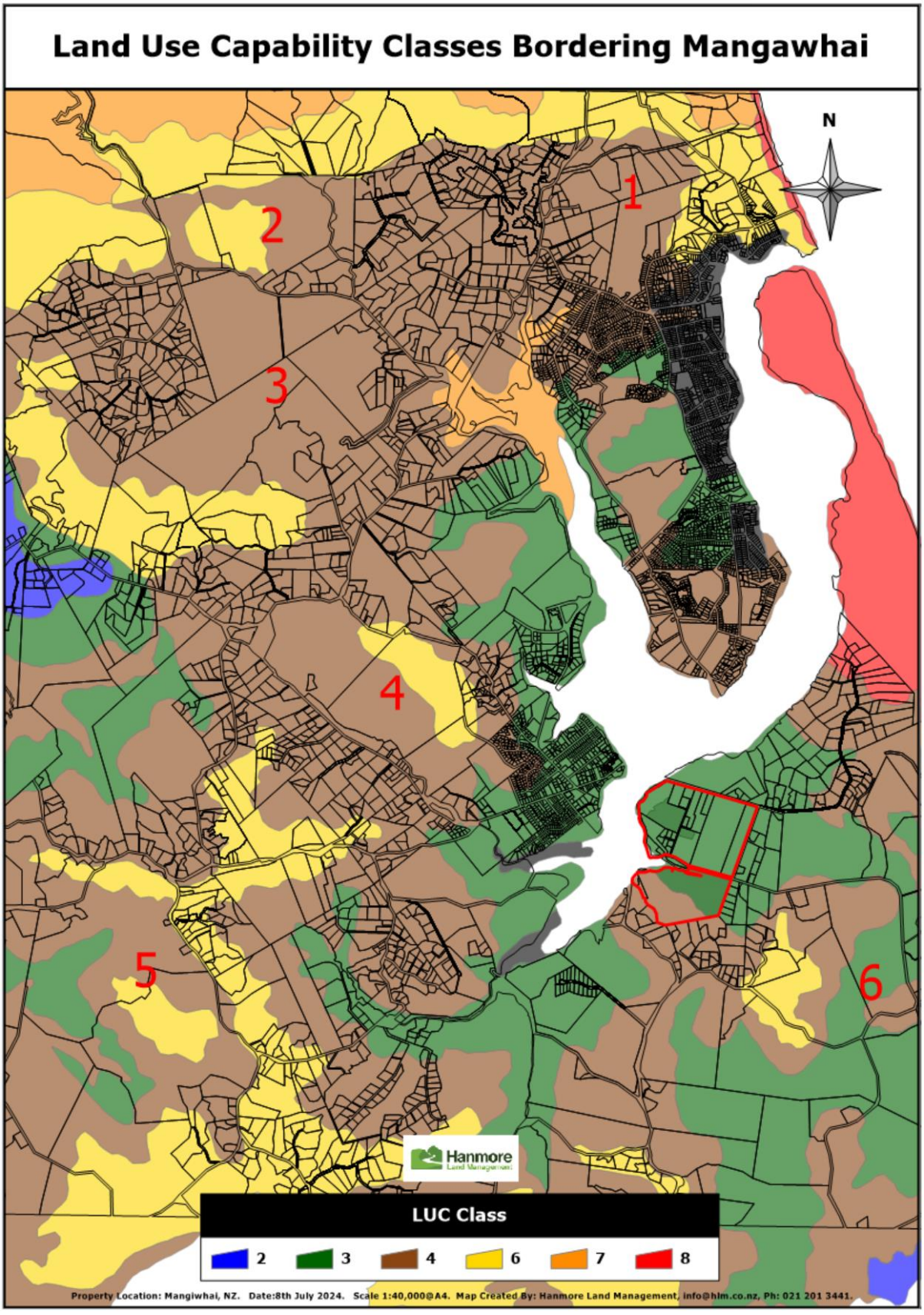

Figure 6. Areas bordering Mangawhai investigated as part of this report with the Proposed Plan Change area outlined in red.

5.2 Area 2 - Kapawiti Road

This area to the northwest of Mangawhai is dominated by LUC class 4 land with a smaller area of LUC class 6. Topography on the class 4 land ranges from flat to strong rolling while the class 6 land is typically moderately steep. Class 4 soils are wet alluvium through to weakly podzolised to podzolised. Class 6 land has strongly leached to weakly podzolised volcanic soils.

Productivity on the steeper class 6 areas is limited to grazing and forestry while the flat to strong rolling slopes of the class 4 areas are suitable for grazing, forestry and root and green fodder cropping. There is no HPL in this area as defined by the NPS-HPL. This area has less productive potential than the PPC area at Black Swamp Road with no class 3 land present.

5.3 Area 3 - Cove Road West

This area to the west of Mangawhai is similar to the area around Kapawiti Road with mostly LUC class 4 land and a small area of LUC class 6 land. Class 4 land is made up of flat topography with podzolised soils through to rolling slopes with strongly leached to weakly podzolised sandstone soils. Due to the slopes, poor soils and wetness limitation the areas of class 4 land can support, grazing, root and green fodder cropping and forestry. The area of class 6 land is suitable for grazing and forestry. There is no HPL at this site with overall productive potential being lower than that of the PPC area at Black Swamp Road.

5.4 Area 4 - Frecklington Farm – Tara Road East

This site is located west of Mangawhai and is dominated by LUC class 4 land with small areas of LUC class 6 and 3. As with the previous two sites the LUC class 4 land on Frecklington Farm is suitable for grazing, root and green fodder crops and forestry while the LUC class 6 land is suitable for grazing and forestry. There is a small area of HPL at the south-eastern end of this site that is similar to the proposed site at Black Swamp Road being flat with poorly drained peaty sand soils. Overall, the productivity potential at this site is lower than at the PPC area at Black Swamp Road site due to much smaller area of LUC class 3 land.

5.5 Area 5 - Kaiwaka Mangawhai Road

This site is located to the southwest of Mangawhai and is dominated by LUC class 4 land with lesser areas of LUC class 3 and 6. Class 4 land is suitable for grazing, root and green fodder cropping and forestry while the class 6 land is suitable for grazing a forestry. The area of class 3, HPL has a different soil type to the PPC area at Black Swamp Road but has similar land use options being suitable for grazing, root and green fodder cropping, cereals, horticulture and vegetables and production forestry. Potential productivity will be slightly higher in this area than the PPC area due to the size of the unfragmented HPL with a significant amount being contained within one legal title.

5.6 Area 6 - Mangawhai East – Rural

This site is located southeast of Mangawhai and is dominated by LUC class 3, HPL with lesser areas of class 4 and 6. Soil types across this site are different to the other five sites discussed. The soils at this location are sand based with class 4 and 6 area having similar productivity potential as the other areas of class 4 and 6 land with class 4 being suitable for grazing, root and green fodder cropping and forestry and class 6 land being suitable for grazing and forestry. The area of HPL at the site is the same as that of the PPC area at Black Swamp Road having peat and peaty sand soils and flat topography. Overall productivity potential will be greater at this site as the legal titles are larger than those at the PPC area and contain larger areas of unfragmented HPL.

6.0 CONCLUSION

Of the six areas bordering Mangawhai that have been examined using the NZLRI mapping data areas five and six are considered to have greater productivity potential than the PPC area. These locations have larger contiguous areas of HPL that are not fragmented by legal parcel boundaries as they are in the PPC area.

The remaining four areas generally have steep topography and poorer soils than those in areas five and six and at the PPC area and have little or no HPL. As such, these four areas have a lower productivity potential than that of the PPC area.

7.0 APPENDICES

7.1 Appendix 1 – Stock Carrying Capacity Rankings.

Stock carrying capacity ranking	Stock units per hectare
very high	>25
high	21–25
moderately high	16–20
medium	11–15
low	6–10
very low	1–5
sparse	<1

Taken from Harmsworth (1996)

7.2 Appendix 2 – *Pinus radiata* Site Index Ranking.

Site index ranking	Site index in metres
very high	>35
high	30–35
medium	25–29
low	20–24
very low	<20

Taken from Harmsworth (1996)

8.0 REFERENCES

Grealish G. 2019. New Zealand soil mapping protocols and guidelines. Manaaki Whenua – Landcare Research.

Harmsworth, G.R. 1996. Land Use Capability classification of the Northland region. A report to accompany the second edition (1:50,000) NZLRI worksheets. Landcare Research Science Series 9. Lincoln, Manaaki Whenua Press.

Hewitt A, Lilburne L 2003. Effects of scale on the information content of soil maps. NZ Soil News 51: 78-81.

Lynn IH, Manderson AK, Page MJ, Harmsworth GR, Eyles GO, Douglas GB, Mackay AD, Newsome PJF 2009. NZ Land Use Capability Survey Handbook – a New Zealand handbook for the classification of land 3rd Edition. Hamilton, AgResearch; Lincoln, Landcare Research; Lower Hutt, GNS Science.

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