AGFIRST

Independent
Agriculture
& Horticulture
Consultant
Network

Avenue Business Park Plan Change - Versatile Soils Report

Prepared for
Warwick and Marion Steffert

Jeremy Hunt
September 2022

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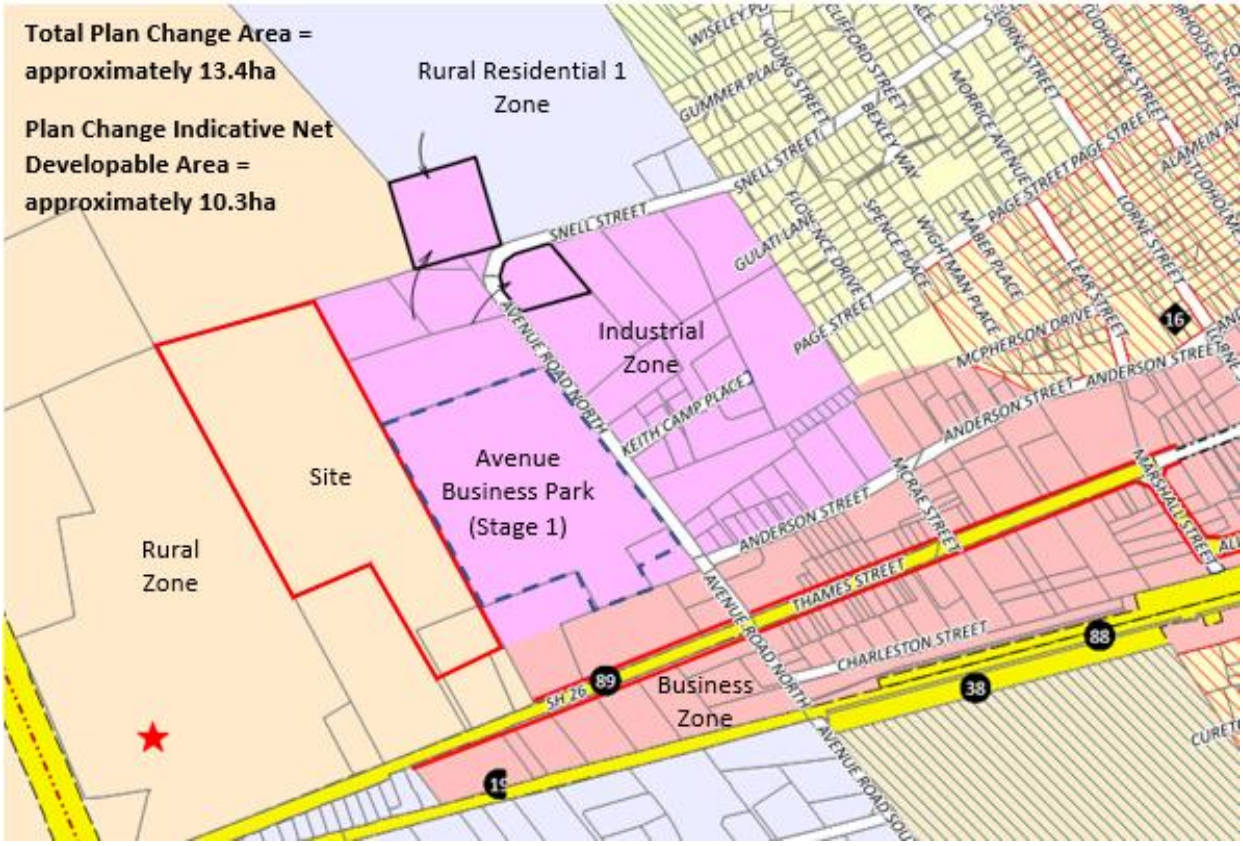
1.0 BACKGROUND

AgFirst Waikato (2016) Ltd has been engaged by Warwick and Marion Steffert to provide an assessment that investigates the presence of high-quality soils and summarises the productive agricultural potential of two parcels of land located at 2581 State Highway 26, Morrinsville (Site).

The area that has been assessed is a 13.4 hectares (ha) section, legally described as Lot 2 DPS 78100 (SA62A/392) and Lot 1 DPS 78100 (SA62A/391). Warwick and Marion Steffert wish to rezone this Site from Rural to Industrial (red outline on Figure 1). The Site is zoned Rural under the Operative Matamata-Piako District Plan (ODP). Adjoining sites to the east are zoned Industrial, to the south Business zone and adjoining sites to the north and west are zoned Rural. There are also Business and Rural Residential zoned properties in the wider area. The block is currently utilised as an extensive low input pastoral grazing block.

In addition to the Site presented in Figure 1, AgFirst have also been asked to comment on other land surrounding Industrial zones within Morrinsville. This includes the suitability for industrial expansion, with regards to the loss of high-quality soils and productive agricultural potential if they were to be rezoned to meet the growth requirements of Morrinsville.

FIGURE 1: PLAN CHANGE SITE



2.0 PROPERTY SUMMARY AND EXISTING LAND USE

The Site highlighted in Figure 1 shows a parcel of land that extends over two titles, both owned by Warwick and Marion Steffert. The rear title consists of a 12.65 ha block that is used for small scale beef grazing operation. At the time of the initial AgFirst site visit (21 July 2022), there were 20 rising two-year old (R2) beef cattle, 7 rising one-year old (R1) beef cattle, 6 calves and 1 mixed age cow. The property is fully subdivided with good quality fences and reticulated stock water in

each paddock. The front property includes a house with a surrounding lifestyle section. The total title size is 1.61 ha, however only the northern part (~0.8 ha) is included in the proposed plan change. This area is run in conjunction with the rear property, with fencing and stock water reticulation. There are also ancillary sheds and stock yards located on this part of the site.

3.0 REGULATORY FRAMEWORK

3.1 Matamata Piako District Plan

The Operative Matamata-Piako District Plan (MPDP) includes 'sustainable activities' objectives and policies (Chapter 3.3.2, Land and Development) which recognise the importance of the District's high quality soils for productive rural use. The way that the district plan seeks to achieve these outcomes is by zoning land for urban purposes and by limiting subdivision and development in Rural zoned areas. The MPDP defines High quality soils as land classified as Class I, II and/or III of the New Zealand Land Inventory Worksheets.

3.2 National Direction

In 2019, the Government consulted on new regulations and a new risk-based approach for improving farm environmental practices through mandatory farm plans in the document Action for Healthy Waterways. The Action for Healthy Waterways introduces new rules and regulations to:

- Stop further degradation of New Zealand's freshwater resources and improve water quality within five years.
- Reverse past damage and bring New Zealand's freshwater resources, waterways, and ecosystems to a healthy state within a generation.

Following this consultation, the summary of decisions was published in May 2020. On 3 September 2020 the National Environmental Standards for Freshwater (NES-F) Regulations came into force.

In addition to the Action for Healthy Waterways, the Ministry for the Environment (MFE) and the Ministry for Primary Industries (MPI) have released the National Policy Statement for Highly Productive Land (NPS-HPL). The objective of this document 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*

The proposed Plan Change has particular relevance to Policy 5 of the NPS-HPL: *The urban rezoning of highly productive land is avoided, except as provided in this National Policy Statement*.

In summary this document aligns with the MPDP, where it identifies LUC Class 1, 2 and 3 (as mapped by the New Zealand Land Resource Inventory or by any more detailed mapping that uses the Land Use Capability classification) as being the most versatile land, with the fewest limitations on its use, and therefore highly productive land.

4.0 METHODOLOGY OF ASSESSMENT

Determining the presence of high-quality soils and highly productive land, as defined under the Land Use Capability (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 classify soils present within the Site:

- Visual soil analysis (VSA) and soil sampling was undertaken to determine the soil types present in addition to the Landcare Research S-Map online, New Zealand Soils Classification (NZSC) and NZLRI national soil database
- Desktop assessment of LUC from the NZLRI portal

In addition to classifying the soils, AgFirst has assessed the productive use of the subject land, taking into account a range of characteristics of the proposed plan change area, 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

4.1 Soil Assessment

AgFirst visited the property a second time on 22 September 2022 to gain further understanding of the potential for this block for productive agriculture and to verify the presence of high-quality soils. In addition to the desktop LUC and soil maps, AgFirst undertook multiple visual soil analysis (VSA) across the property and undertook some soil samples for a mixed soil analysis - drystock.

4.1.1 Visual Soil Analysis

AgFirst followed the procedures outlined in the Visual Soil Assessment Field Guide[1]. Many soil properties can be identified by their visual characteristics, which involves digging out and assessing a 20 cm cube of topsoil. The quality of soil is subject to the current and previous land use and management. Once soils have been degraded, it can take a long time (sometimes decades) to recover.

[1] Shepherd, T.G. 2000: Visual Soil Assessment. Volume 1. Field guide for cropping and pastoral grazing on flat to rolling country. Horizons.mw & Landcare Research, New Zealand.

The soil indicators used in the VSA are: soil structure and consistence; soil porosity; soil colour; number and colour of soil mottles; earthworm counts and surface relief. Using the VSA scorecard, soil quality is ranked as poor (< 9), moderate (10 - 20) or good (> 20).

4.1.2 Soil Sampling

AgFirst undertook soil sampling across some representative pastoral areas of the Site. Based on the existing land use, these tests were carried out in accordance with the soil sampling procedure for dry stock farms. At each location, numerous core samples were taken of the topsoil down to 7.5 cm, and analysed by Hill Laboratories - Soil Mixed Pasture, Drystock (Sed) (S186).

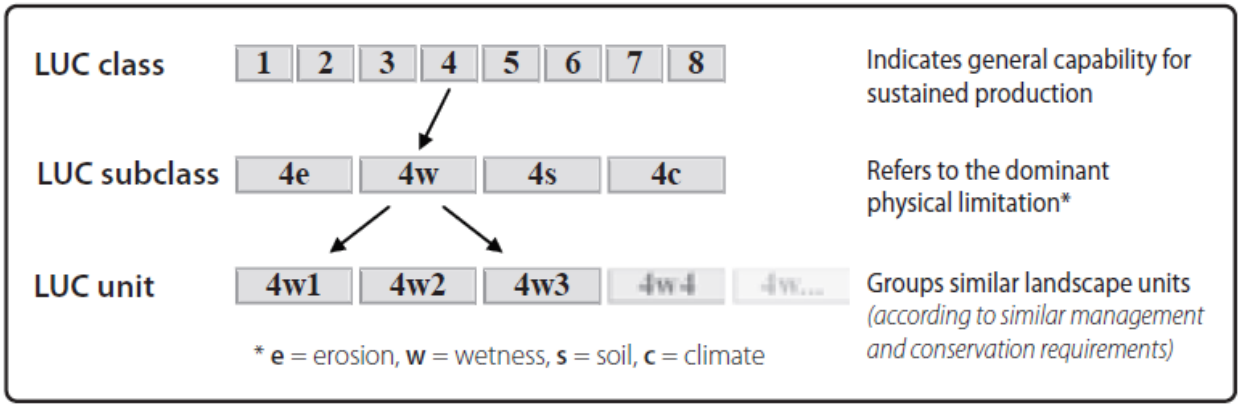
4.1.3 Soil Identification

AgFirst has used the Landcare Research S-Map Online, NZSC soils map viewer and the NZLRI portal to help understand the soils present and their characteristics. This data is represented as a scale of greater than 1:50,000 scale digital map. These maps are useful for understanding regional soil variations, although they are not designed to be interpreted at a farm or paddock scale.

4.2 Land Use Capability Classification

The LUC Classification system has been used in New Zealand to help achieve sustainable land development and management on farms. The LUC classification categorises land areas or polygons into classes, subclasses, and units according to the land's capability to sustain productive use. This is summarised in Figure 2 below.

FIGURE 2: COMPONENTS OF THE LAND USE CAPABILITY CLASSIFICATION[2]



4.2.1 New Zealand Land Resource Inventory - LUC

AgFirst has used the New Zealand Land Resource Inventory (NZLRI) national database of physical land resource information. Within this database is a regional scale LUC rating of the ability of each polygon to sustain agricultural production. This 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. These have been produced at a 1:50,000 scale and are suitable for guidance, but are not specifically designed to be interpreted at a farm or paddock scale.

[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.

5.0 ASSESSMENT RESULTS

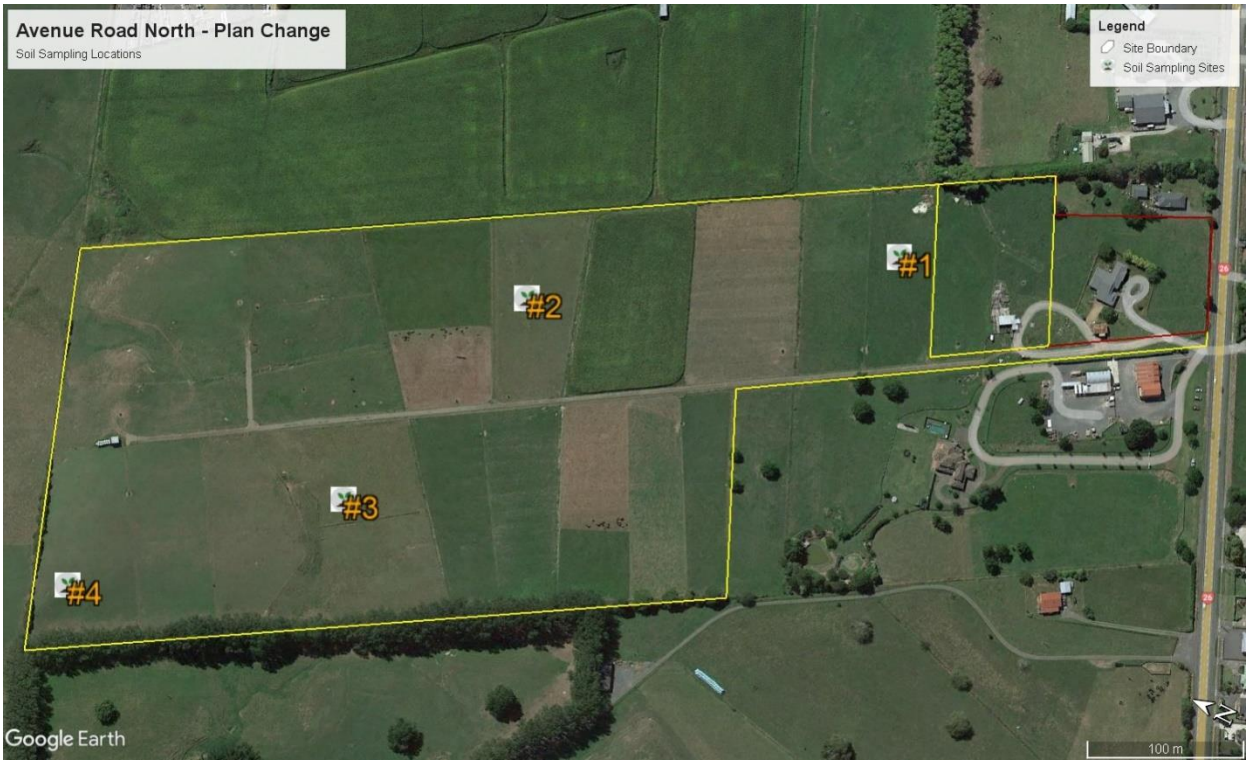
This Section presents the results and outcomes from the soil and LUC assessment based on information obtained on site and using the available New Zealand soils resources and database.

5.1 Soil Assessment

5.1.1 Visual Soil Analysis Results

AgFirst undertook four VSA samples across the Site (shown on Figure 3) and completed the scorecard to identify the suitability of the soil for agricultural production. This information was used in conjunction with the NZLRI and online soils data for the property.

FIGURE 3: LOCATION OF VSA AND SOIL SAMPLING



A summary of the soil indicators from the VSA is detailed below in Table 1 with photos of each sample presented in Figure 3. Soil # 1, 2 and 3 were on the flats, with gley poor draining soils. Soil # 4 is elevated on a slope, with granular moderately free draining soils. The soil classifications and distribution is presented in 5.1.3.

TABLE 1: VISUAL SOIL ASSESSMENT RESULTS UNDERTAKEN AT EACH SITE

Visual Indicator of Soil Quality	Soil # 1	Soil # 2	Soil # 3	Soil # 4
Soil Structure and Consistency	2	2	1	2
Soil Porosity	1	2	1	2
Soil Colour	1	1	1	2
Number and colour of Soil Mottles	1	1	1	2
Earthworm Counts	0	0	0	0
Surface Relief	1	1	1	2
Overall Score	**14**	**17**	**11**	**22**
Ranking	**Moderate**	**Moderate**	**Moderate**	**Good**

Soil Structure and Consistence

Soil # 1, 2 and 4 had good structure and distribution of finer aggregates, while soil # 3 had moderate structure, with proportions of both coarse firm clods and friable fine aggregates. The soil depth at soil # 1 and 3 was noticeably shallow, with approximately 15 cm of topsoil before hitting clay with strong mottling and pale coloured subsoils.

- Soil structure is vital for growing good pastures as it regulates soil aeration and gaseous exchange rates, the movement and storage of water, soil temperature, root penetration and development, nutrient cycling, and resistance to degradation.

Soil Porosity

Soil #1 and 3 had moderate porosity, with a moderate amount of consolidation. Soil # 2 and 4 showed good porosity.

- The macroporosity controls the movement of air and water in the soil. Low porosity will restrict air and water movement, which reduces root activity and pasture growth.

Soil Colour

All the lower soil sites (# 1 – 3) had moderate soil colour, as an indication of gleying due to pugging and water damage. Soil # 4 consisted of a dark and deep topsoil, indicating well aerated with a good turnover of organic matter.

Number and Colour of Soil Mottles

All the lower soil sites (# 1 – 3) had moderate soil mottling, between 10-25%. This is evidence of the poor drainage and resultant pugging and an elevated ground water table. Soil # 4 was good condition, with the free draining soils having minimal soil mottles within the topsoil layer.

- Mottles are also an indication of aeration and drainage and a warning sign that the soil is becoming, or is currently, damaged.

Earthworm Counts

The number of earthworms counted at each of the sites was low to moderate in the assessments. Given the wet conditions that were experienced at the time of completing the visit this may have had an influence on why they were not present in the soil assessment for any of the sites.

- Earthworms play an important role in decomposing and cycling organic matter, and in supplying nutrients to the plants. Earthworm numbers can decline if soils are waterlogged or if severe pugging occurs, which can result in long-term effects.

Surface Relief

The relief and surrounding conditions at the lower sites were of moderate condition, with visible pugging and in many places ponding water in the hoof prints. Soil # 4 was in good condition with a relatively smooth surface.

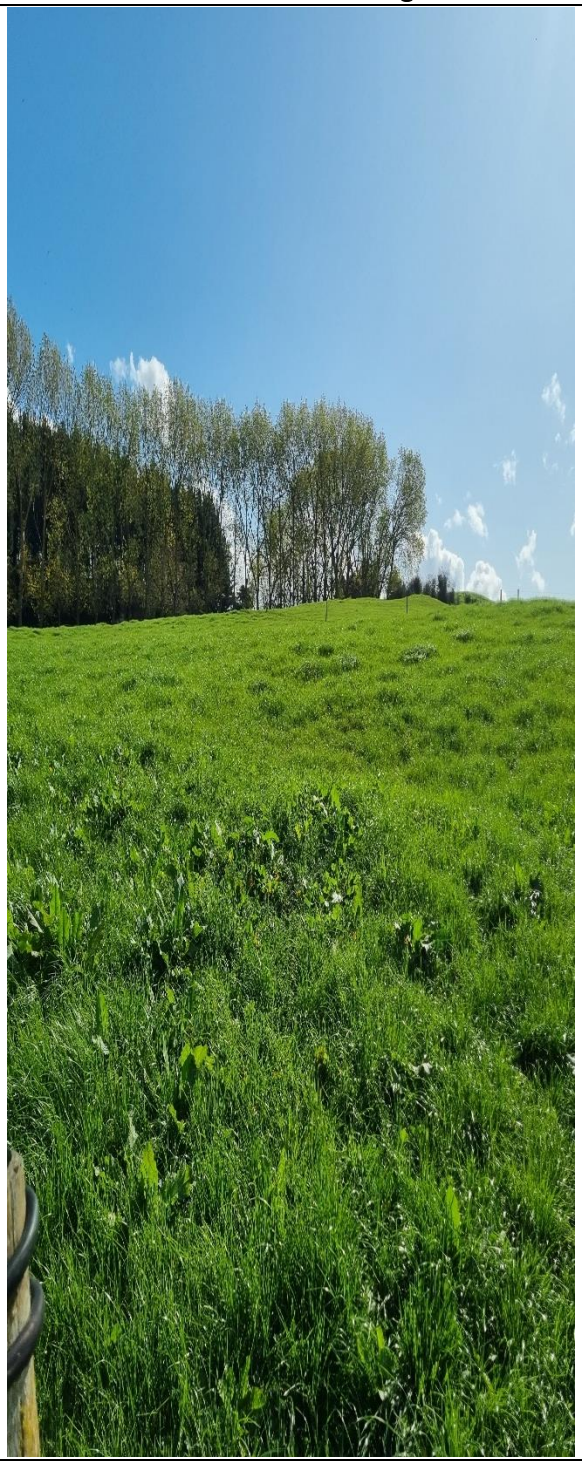
- Surface relief shows the severity of pugging severely under intensive grazing systems and indicates structural damage below the surface of the soil. This reduces the pores in the soil, which are important for water nutrient and air movement, and root penetration.

FIGURE 4: PHOTOS OF VISUAL SOIL ASSESSMENTS

Soil # 1 - VSA	Soil # 1 Soil Core
	

Soil # 2 - VSA	Soil # 2 Surroundings
	

Soil # 3 - VSA	Soil # 3 Soil Core
	

Soil # 4 - VSA	Soil # 4 Surroundings
	

5.1.2 Soil Sampling Results

Soil sampling was undertaken at Soil # 1 and Soil # 4 (**Error! Reference source not found.**). The results from the soil test analysis indicate that the macro nutrients are typically below and within the optimum levels when compared with the ranges for drystock farming on sedimentary soils. The results of the soil tests are presented in Table 2 and summarised below. The full analysis is also included in Appendix A.

- pH – The pH levels for Soil # 1 are within the optimum requirements, while Soil # 4 is slightly below, requiring some lime to elevate the slightly acidic soils.
- Olsen P – The Olsen P levels at Soil # 1 are slightly above the optimum range, while Soil # 4 is well below the recommended levels, with drystock farms requiring an optimum Olsen P between 20-30. Soil # 4 would benefit from significant capital phosphorus fertiliser, even for a low stocked drystock farm.
- Potassium – Both soil samples returned results below the optimum range, requiring capital fertiliser to achieve recommended fertility.
- Sulphate Sulphur – This nutrient was not included in the chemical analysis.
- Magnesium – Both soil samples showed good magnesium fertility.

TABLE 2: SOIL TEST RESULTS

Analysis	Soil # 1	Soil # 4	Recommended
Sample Depth (cm)	7.5	7.5	7.5
pH (pH Units)	5.8	5.6	5.8-6.0
Olsen Phosphorus (mg/L)	31	5	20-30
Potassium (MAF Units)	5	5	7-10
Sulphate Sulphur (mg/kg)	Not tested	Not tested	10-12
Magnesium (MAF Units)	22	13	8-10
Calcium (MAF Units)	9	3	N/A
Sodium (MAF Units)	7	8	N/A

The soil test results at Soil # 4 shows a depletion in the key nutrient levels Phosphorus (P), Potassium (K) and slightly acidic soils compared to optimum levels. The fertility at Soil # 1 was generally within the agronomic optimum for this land use, with the exception of soil K levels being slightly below. Given the end use of the property (lowly stocked farm), while pasture production would be compromised, the optimum and recommended fertility levels will not be the same as the economic optimum due to the return on fertiliser costs etc. The key limiting factor is the P levels on the slopes to the north of the Site.

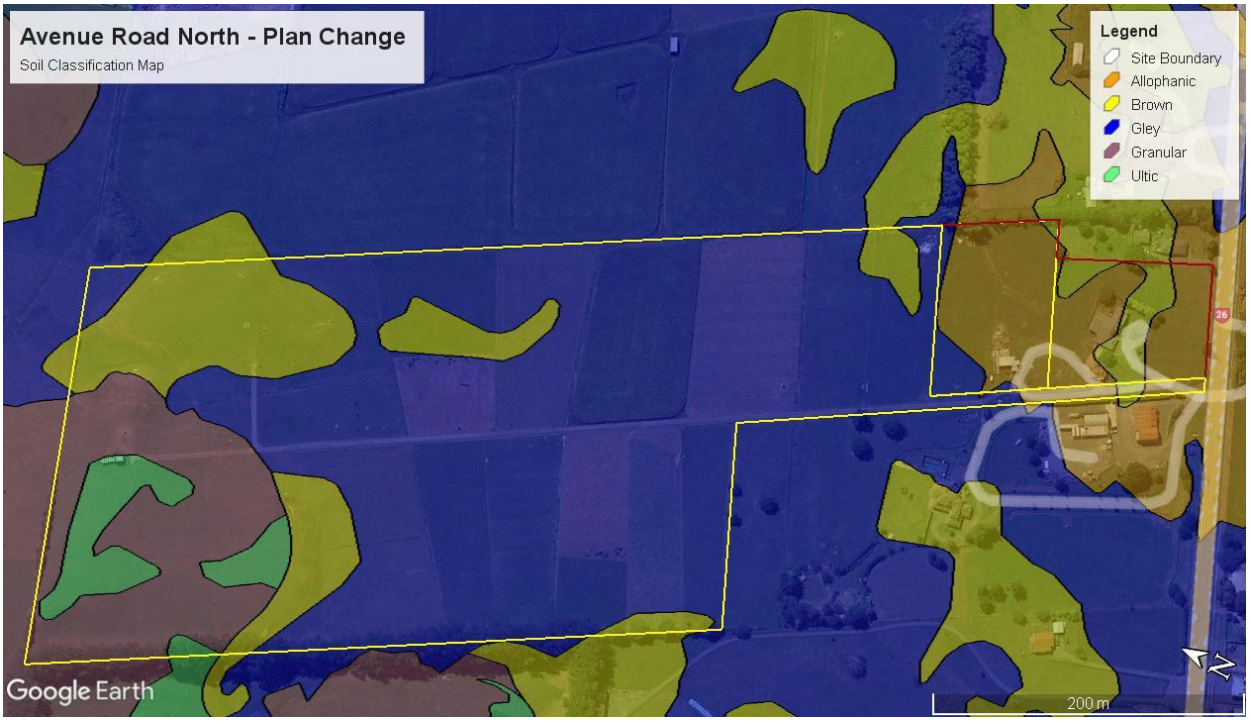
5.1.3 National Soils Database

Landcare Research S-Map Online, NZSC and the NZLRI database have been utilised to provide a high-level overview of the soil classification and soil drainage present on this property. These are presented in Figures 5 and 6 below. A map with 1 m LIDAR contours is provided in Figure 7. Given the wet early spring conditions, and recent rainfall events leading up to the site visit, some of the soils were at field capacity, as on the day of the visit some water logging was seen in areas of the proposed plan change area. This provided supporting evidence of the drainage capacity of the soils. The areas of waterlogging were located across the southern and low-lying portion of the site, while the rolling land to the north was dry underfoot, confirming the S-Map database drainage classification.

The distribution of soils based on the S-Map representation, indicate that there are Typic Orthic Gley soils to the south on the flats. These are silty clay soils with high water logging vulnerability. The soil is formed in layers of alluvium. The soil is poorly drained resulting from compact subsoil layers with slow permeability, which is suited to pastoral farming, but not suitable for horticultural crops susceptible to wet soil conditions[3].

The soils to the north of the block are largely Typic Orthic Granular and Mottled Orthic Brown soils, that are moderately well drained and imperfectly drained respectively. The Granular soil is formed in strongly weathered volcanic ash of the Hamilton Ash Formation. The soil is moderately well drained with moderately slow permeability, suited to pastoral farming, cropping and forestry. The Brown soil is formed in clayey alluvium, with sands or gravel occurring below 60 cm from the surface. The soil is imperfectly drained with moderate to slow permeability, which is suited to pastoral farming, cropping and forestry[3]. However, although the soils are of high quality, due to the slope, most of these areas would not be suited to horticulture or arable purposes.

FIGURE 5: SOIL CLASSIFICATION MAP REPRESENTATION



[3] www.nzsoils.org.nz

FIGURE 6: SOIL DRAINAGE MAP REPRESENTATION

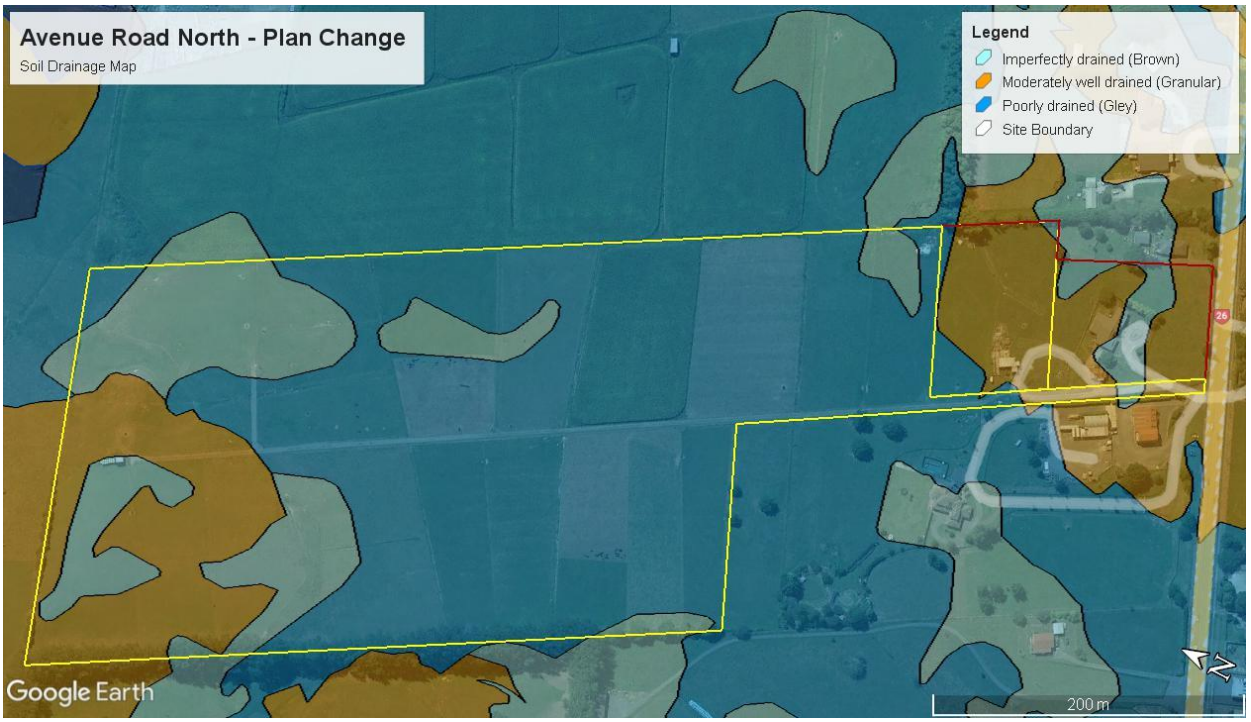
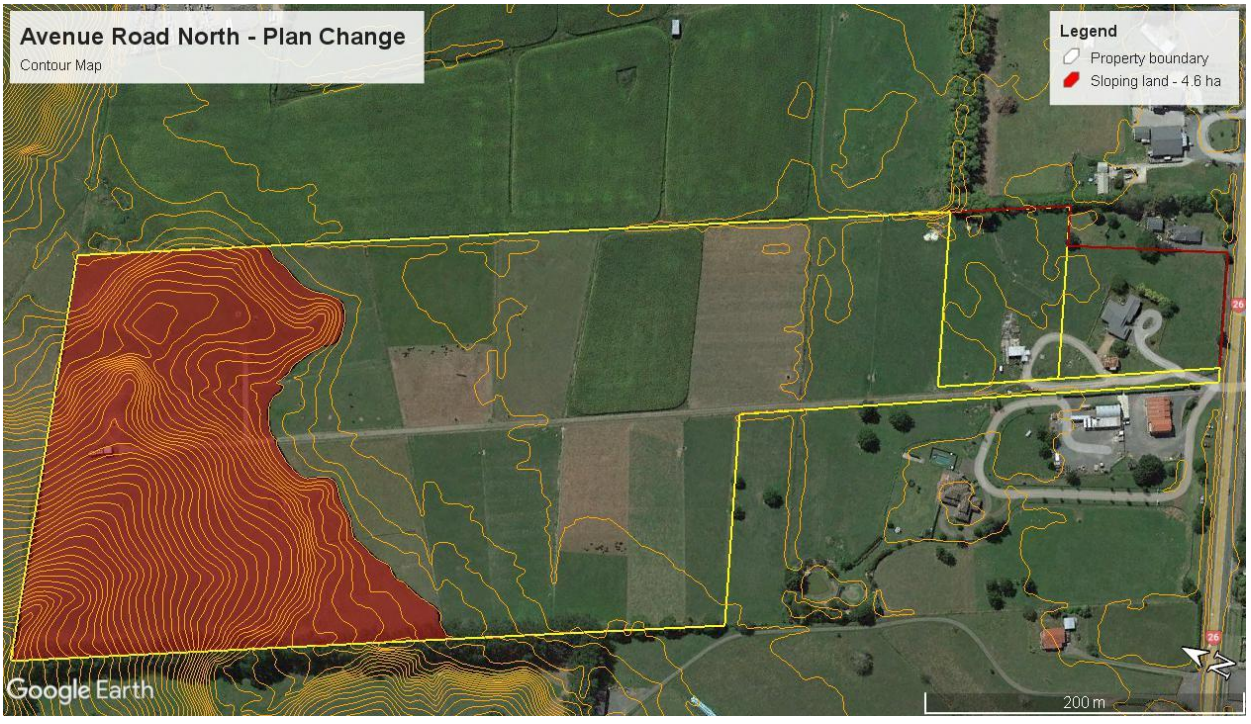


FIGURE 7: CONTOUR MAP REPRESENTATION



5.2 Land Use Capability Assessment

AgFirst has used the NZLRI national database to provide a breakdown of the Site. 13.1 ha of the total Site (13.4 ha) is classified as LUC 2. The remainder of the Site is classed as LUC 4. The NZLRI LUC classifications for this area are presented in Table 4 and in Figure 8:

TABLE 4: LAND USE CAPABILITY CLASSIFICATION

LUC Class	Slope Class	Colour on Map	Area
LUC 2s	Flat to gently undulating (A) & Undulating (B)	Yellow	13.1 ha
LUC 4	Strongly rolling (D)	Light blue	0.3 ha
Total			**13.4 ha**

The slope of the section is relatively flat land to undulating land for the majority (areas to the south), with some strongly rolling towards the north. While the NZLRI only shows a small area to the north with strongly rolling, following the farm visit and reviewing LIDAR data, this area is likely to be approximately 4.6 ha.

Most of the Site is classified under the NZLRI database as LUC 2. This indicates that the soils are in the of high-quality category and highly versatile, with these classifications being suitable for most productive agricultural systems. The NZLRI classifies these soils as an LUC 2s 3 - a typic orthic allophanic soil, made up of Horotiu silt loams. However, it is of AgFirst opinion, and supported by the S-Map soil classification that these are typic orthic gley soils. The key limitation to these soils is the wetness and underlying poor drainage. It was noted that there was waterlogging to excessive wetness after drainage, consistent with the description for an LUC 3 or LUC 4 classification. The LUC handbook describes the wetness limitations for the various LUC subclasses as below[4]:

LUC subclass	Description	Days of continuous inundation
1w	Not applicable	
2w	Inundation lasting 1–2 days, not more frequently than once in 2 years. Yield of sensitive crops is affected but survival is not.	1
3w	Inundation lasting 1–2 days on average once per year; or lasting 2-3 days once every 2 years. Some crops do not survive. Others have reduced yield.	1-2
4w	Inundation lasting 2–4 days on average once per year. Cropping of annual ground crops is marginal, tree crop yields are reduced.	2-4

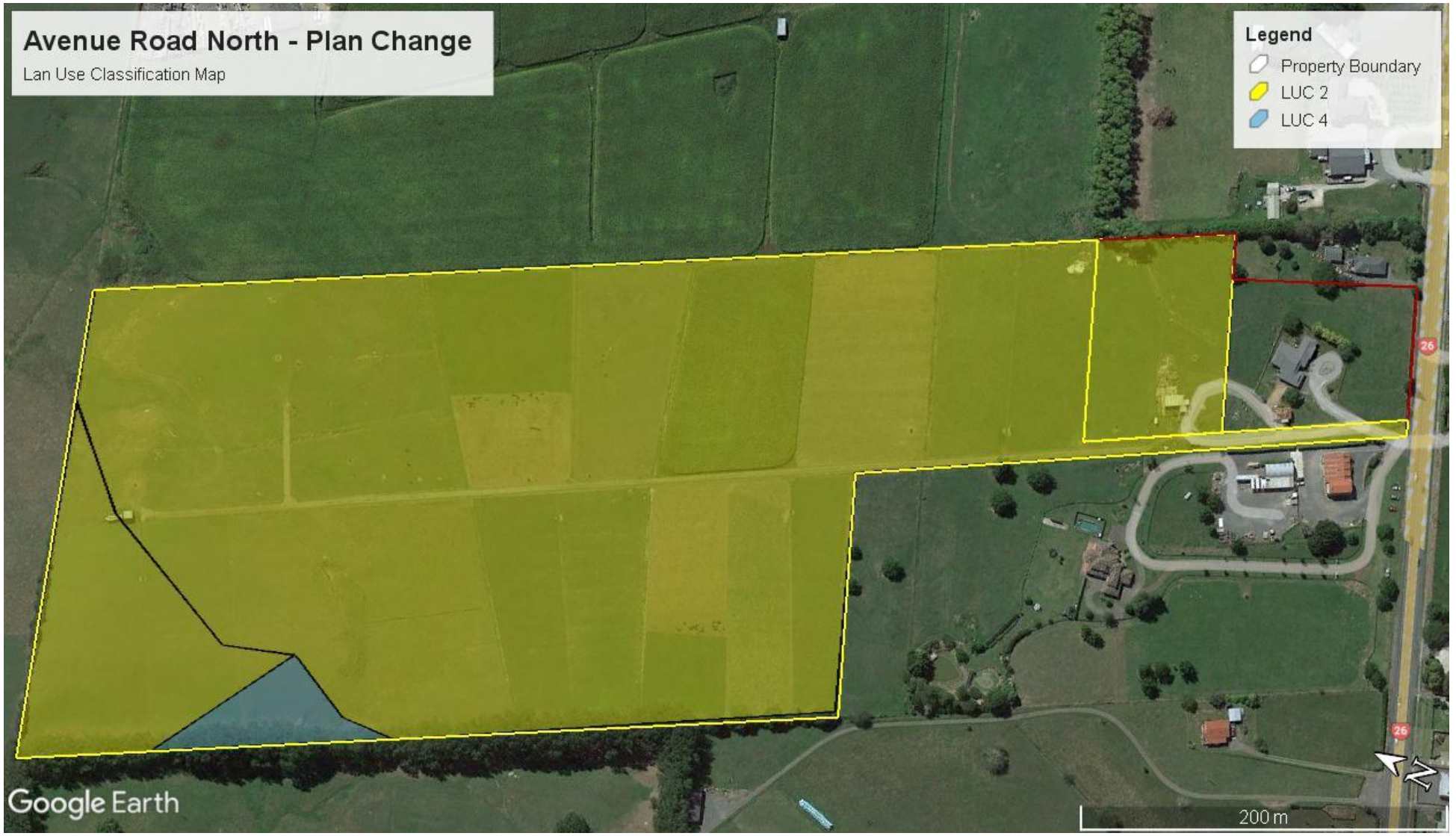
Therefore, with the wetness limitations of the lower terrace to the south and the slope limitations to the north, the distribution of high-quality soils suitable for versatile agricultural land use is relatively low. As detailed in Section 4.2.1, the maps produced within the NZLRI have been produced at a 1:50,000 scale are not specifically designed to be interpreted at a farm or paddock scale. Thus, likely missing the wet soils and sloping land, which have severe underlying limitations to this land.

Having undertaken chemical analysis within the pastoral areas, although there appears to be a nutrient deficiency on some of the soils, this can be actively managed and rectified. Although, with the existing land use, being a lowly stocked beef block, this may not be economically viable. Therefore, it is likely that the following are the soil limitations for highly productive land:

- Poor drainage on the low-lying areas of the site, with pugging vulnerability and yield, damage and survival to crops
- Slopes that would not support the long-term sustainability of intensive agricultural systems due to the risk of soil erosion when cultivated

[4] LUC Handbook, 34d edition - Table 14 – The relationship between LUC classes with a 'w' limitation

FIGURE 7: NZLRI LUC CLASSIFICATION



6.0 LAND USE POTENTIAL

The proposed industrial plan change Site, according to the NZLRI, is largely on versatile soils and classified as LUC 2 land. In theory this means that the site has potential for a wide range of agricultural and horticultural activities. However, in practice and upon inspection of the property, the limitations outlined in Section 5.1.3 (wetness and slope) reduces the versatility and land use options available, with intensive pastoral grazing likely the best and highest use.

With pastoral grazing being the most productive use for this block, there are also significant constraints due to:

- The small scale of the Site without viable options for expansion
- The baseline and current farming operation requiring land use change consents to improve productivity into alternative pastoral grazing operations
- Sensitivity and receptors with industrial, business and surrounding rural lifestyle blocks

Based on the Beef and Lamb data for Northern North Island Class 5 finishing, the forecast farm profit before tax is estimated as being $647 per ha[5]. Note that this economic figure is based on a North Island intensive finishing operation with a scale of 255 ha. Based on the entire Site located at 2581 State Highway 26, Morrinsville being effective grazing, this will provide an estimated income from the land of $8,700 before tax. Due to the inefficient scale of this block, compared to a full-scale intensive operation, the likely income is likely to be much lower than presented. Therefore, the scale of this operation is not at all profitable as a standalone beef farming operation. A farm of this size and scale to be run as a livestock operation is only suited as a hobby farm or lifestyle block. There is also very limited, to no opportunity to expand the operational scale due to the established surrounding dairy farms and already zoned or developed land to the east and south.

There are much higher returns for pastoral farming, including dairy heifer grazing, a dairy support runoff, or leasing/incorporating into the neighbouring dairy operation. However, all off these options are considered intensification, based on subpart 2 of the NES-FW released in 2020. This legislation requires a land use change discretionary activity consent when converting land into dairy or dairy support, pending the baseline land use at the time of the reference period. For consent to be granted, the enterprise must demonstrate that the proposed land use does not have any more impact on the catchment than during the baseline year. For this Site, that baseline was a lowly stocked beef operation, therefore of relatively low environmental impact (nutrient losses) to the receiving environment and catchment, and success of this type of consent would be low.

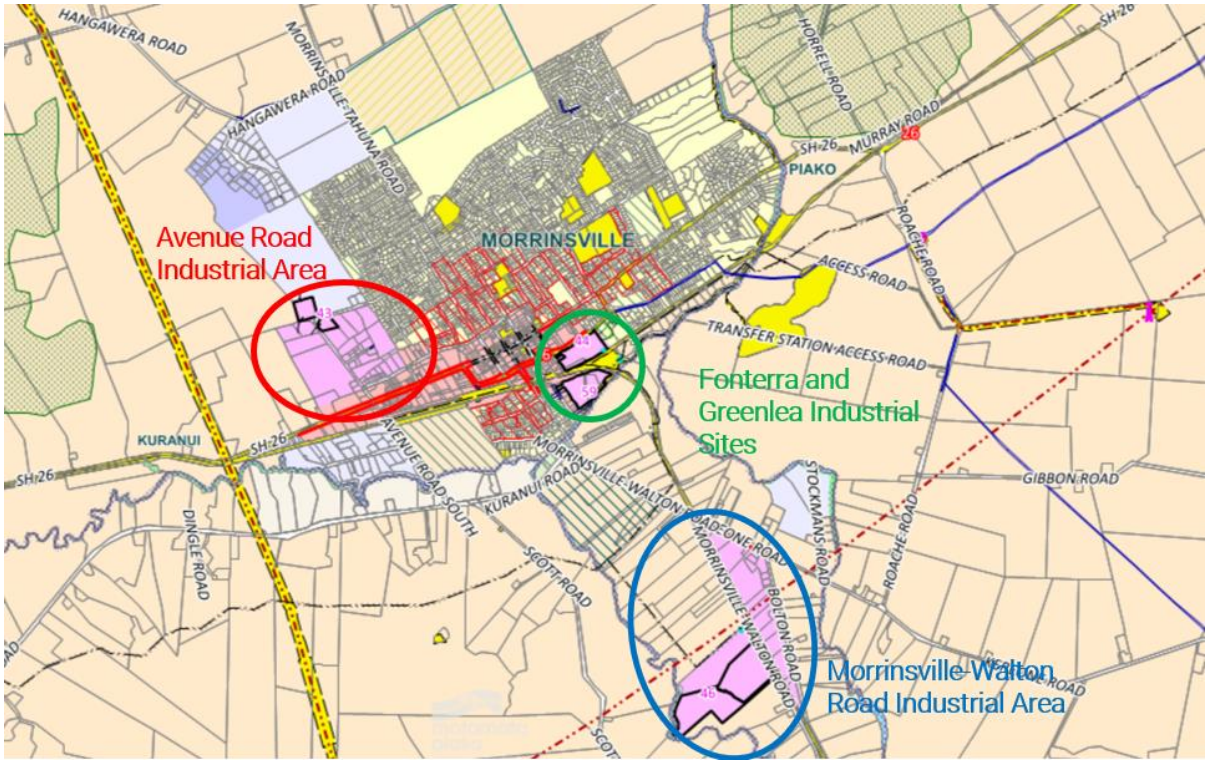
There is also the issue of sensitive receptors, given the development immediately surrounding the Site. With horticultural activities, there are issues with sprays and noise from frost protection, while dust can be an issue for arable operations following cultivation and harvest events. Investment into intensive agricultural operations with adjoining business and residential zones is a risk.

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

7.0 POTENTIAL FOR ALTERNATIVE INDUSTRIAL ZONES IN MORRINSVILLE

AgFirst has been asked to comment on the comparative productive land use of land surrounding other industrial zones within Morrinsville. These areas have been identified as the Fonterra and Greenlea Industrial Sites; and the Morrinsville-Walton Road Industrial Area. These are presented in Figure 8.

FIGURE 8: MORRINSVILLE INDUSTRIAL ZONE LOCATIONS



FONTERRA AND GREENLEA INDUSTRIAL SITES

There is very limited potential for expansion of industrial activity in this area, as the effective area is already developed. The immediate areas to the south and east that are zoned rural are also constrained by the waterways and native bush, providing limited access with a fragmented industrial development. The surrounding soils are allophanic, free draining soils (S-Map Figure 9) which are flat to undulating. The gully areas consist of mottled fluvial recent soils that have imperfect drainage. Therefore, these adjacent land areas are considered much more versatile with higher productive land use compared to the assessment Site.

MORRINSVILLE-WALTON ROAD INDUSTRIAL AREA

The land immediately surrounding the Morrinsville-Walton Industrial Park (currently the site of Ballance Agri-Nutrients), is part of a much more intensive agricultural land use. The blocks are used predominantly as intensive dairy support and heifer grazing and also frequent maize rotations. The land is flat to undulating, with S-Map classifying the soils as a mix between imperfectly drained Mottled Orthic Brown Soils and poor draining Typic Orthic Gley Soils (Figure 10). Although this is a similar soil, the Temuka is described as soil used mainly for pastoral farming and a small proportion is used for mixed cropping. With the surrounding soils being more versatile, and also the current land use not being as restrictive (ability to farm more intensively as a dairy support or dairy grazing operation without requiring resource consent), there is more agricultural opportunity. Therefore, the adjacent land areas are considered more versatile with higher productive land use compared to the assessment Site.

FIGURE 9: S-MAP REPRESENTATION FOR LAND ADJACENT TO FONTERRA AND GREENLEA INDUSTRIAL SITES

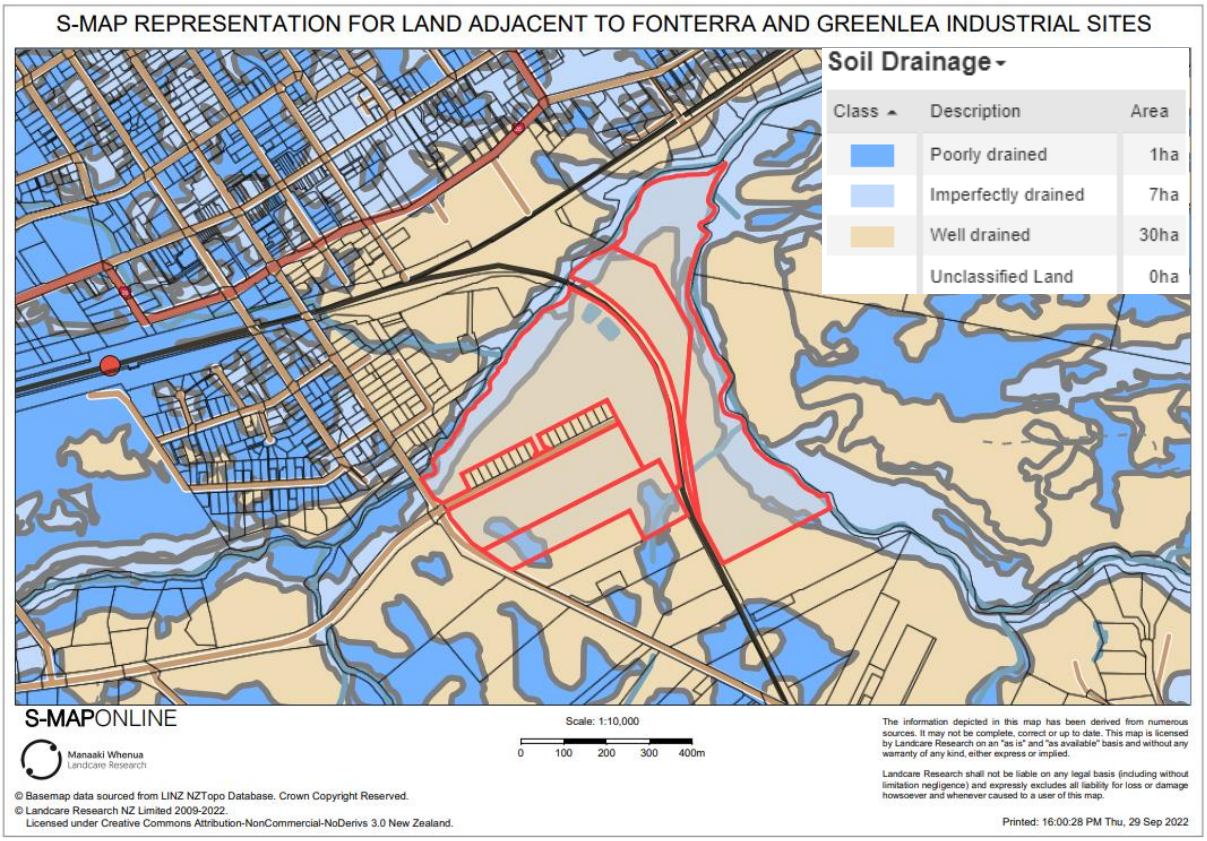
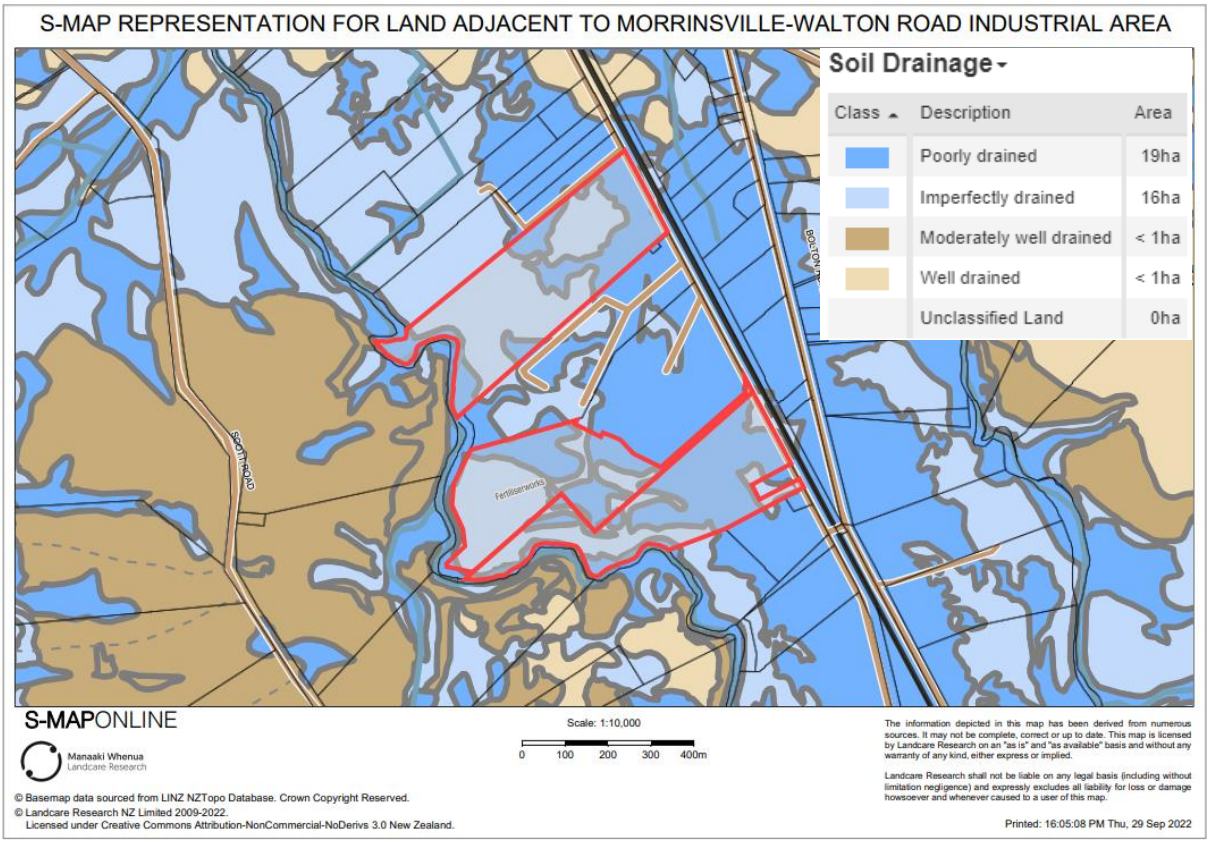


FIGURE 9: S-MAP REPRESENTATION FOR LAND ADJACENT TO MORRINSVILLE-WALTON ROAD INDUSTRIAL AREA



8.0 SUMMARY

Overall, while the land and soils within the Site are categorised as high-quality under the NZLRI, the practical likelihood of any sustained existing or intensive agricultural operation would be restricted due to:

- Lack of versatility due to wetness and slope limitations
- The small scale of effective land would not be commercially viable for current or future agricultural options
- Lack of expansion or improvement options – due to national regulations restricting intensification
- Current surrounding land use (lifestyle blocks, urban development and business zoning) and sensitivity effects of any intensified operations on an expanding urban population
- Alternative options within Morrinsville for industrial land use re-zoning surrounding existing industrial areas have much greater agricultural productive capacity

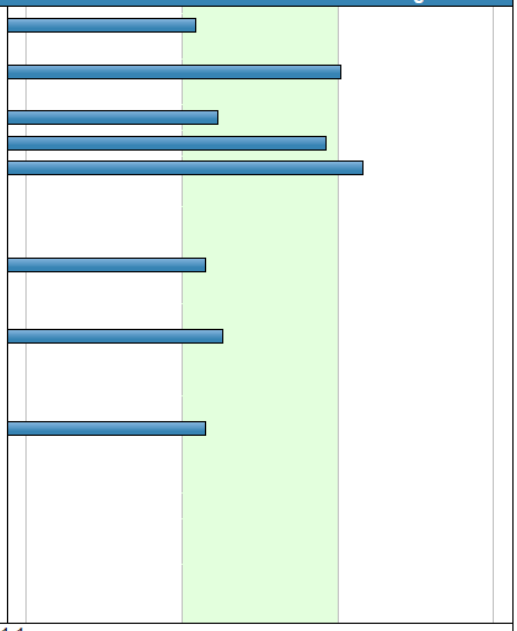
Given the constraints identified above, using this property as a productive agricultural business will unlikely be commercially viable now or in the future. It is AgFirst opinion that by allowing the proposed plan change to proceed from rural to industrial zone, it will have no material impact on future agricultural or horticultural potential and with regard to highly productive land.

Certificate of Analysis

Client:	AgFirst Waikato (2016) Limited	**Lab No:**	3081760	shvpv1
Address:	PO Box 9078 Hamilton 3240	**Date Received:**	22-Sep-2022	
		Date Reported:	29-Sep-2022	
		Quote No:		
		Order No:		
		Client Reference:	Steffert	
Phone:	07 839 2683	**Submitted By:**	Jeremy Hunt	

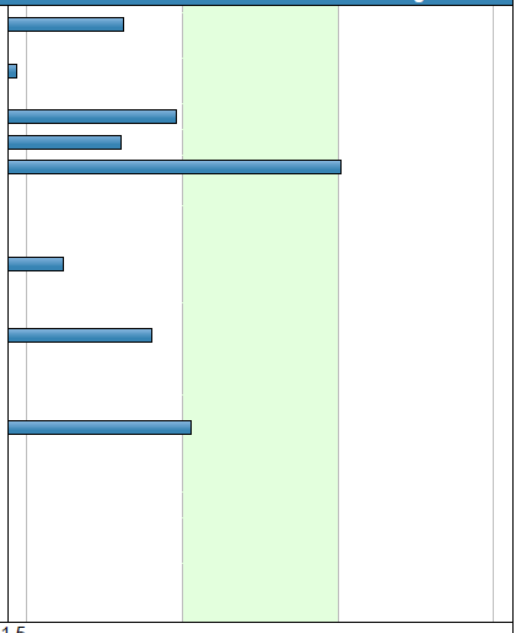
Sample Name: #1 Steffert **Lab Number:** 3081760.1
Sample Type: SOIL Mixed Pasture, Dry Stock (Sed.) (S186)

Analysis		Level Found	Medium Range*
pH	pH Units	5.8	5.8 - 6.2
Olsen Phosphorus	mg/L	31	20 - 30
Potassium	me/100g	0.32	0.30 - 0.40
Calcium	me/100g	9.6	4.0 - 10.0
Magnesium	me/100g	1.31	0.40 - 0.60
Sodium	me/100g	0.21	
CEC	me/100g	20	
Total Base Saturation	%	58	55 - 75
Volume Weight	g/mL	0.73	
Potentially Available Nitrogen (15cm Depth)*	kg/ha	176	150 - 250
Anaerobically Mineralisable N*	µg/g	160	
Organic Matter*	%	8.5	7.0 - 17.0
Total Carbon*	%	5.0	
Total Nitrogen*	%	0.41	
C/N Ratio*		12.2	
Anaerobically Mineralisable N/Total N Ratio*	%	3.9	
Soil Sample Depth*†	mm	0-75	
Soil Type*†		Sedimentary	
Base Saturation %		K 1.6 Ca 49	Mg 6.7 Na 1.1
MAF Units		K 5 Ca 9	Mg 22 Na 7



Sample Name: #4 Steffert **Lab Number:** 3081760.2
Sample Type: SOIL Mixed Pasture, Dry Stock (Sed.) (S186)

Analysis		Level Found	Medium Range*
pH	pH Units	5.6	5.8 - 6.2
Olsen Phosphorus	mg/L	5	20 - 30
Potassium	me/100g	0.30	0.30 - 0.40
Calcium	me/100g	3.2	4.0 - 10.0
Magnesium	me/100g	0.69	0.40 - 0.60
Sodium	me/100g	0.20	
CEC	me/100g	14	
Total Base Saturation	%	32	55 - 75
Volume Weight	g/mL	0.82	
Potentially Available Nitrogen (15cm Depth)*	kg/ha	131	150 - 250
Anaerobically Mineralisable N*	µg/g	106	
Organic Matter*	%	7.6	7.0 - 17.0
Total Carbon*	%	4.4	
Total Nitrogen*	%	0.38	
C/N Ratio*		11.7	
Anaerobically Mineralisable N/Total N Ratio*	%	2.8	
Soil Sample Depth*†	mm	0-75	
Soil Type*†		Sedimentary	
Base Saturation %		K 2.1 Ca 23	Mg 5.0 Na 1.5
MAF Units		K 5 Ca 3	Mg 13 Na 8



Contact

Jeremy Hunt

Agribusiness Consultant
Phone: 027 203 6182

Email: jeremy.hunt@agfirst.co.nz

AgFirst Waikato (2016) Ltd
26D Liverpool Street
PO Box 9078, Hamilton 3240, New Zealand
07 839 2683
waikato@agfirst.co.nz
www.agfirst.co.nz